

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

2001 MANUAL TRANSMISSIONS

NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

SPECIFICATIONS

Application	Specification	
	Metric	English
Backup Lamp Switch	37 N·m	27 lb ft
Clutch Actuator Cylinder Bolt	8 N·m	71 lb in
Control Lever Boot Screw	1.6 N·m	14 lb in
Input Shaft Bearing Retainer Bolt	14 N·m	10 lb ft
Oil Drain and Fill Plugs	30 N·m	22 lb ft
Shift Lever Assembly Nut	37 N·m	27 lb ft
Shift Lever Bolt	20 N·m	15 lb ft
Transmission Bolt/Stud	50 N·m	37 lb ft
Transmission Cover Bolt	9 N·m	80 lb in
Transmission Mount Bolt	50 N·m	37 lb ft
Transmission Mount to Crossmember Nut	40 N·m	30 lb ft
Vehicle Speed Sensor	16 N·m	12 lb ft

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Fig. 1: Fastener Tightening Specifications

Application	Specification	
	Metric	English
Synchromesh Transmission Fluid GM P/N 12345349 (Canadian P/N 10953465)	2.0 liters	2.2 quarts

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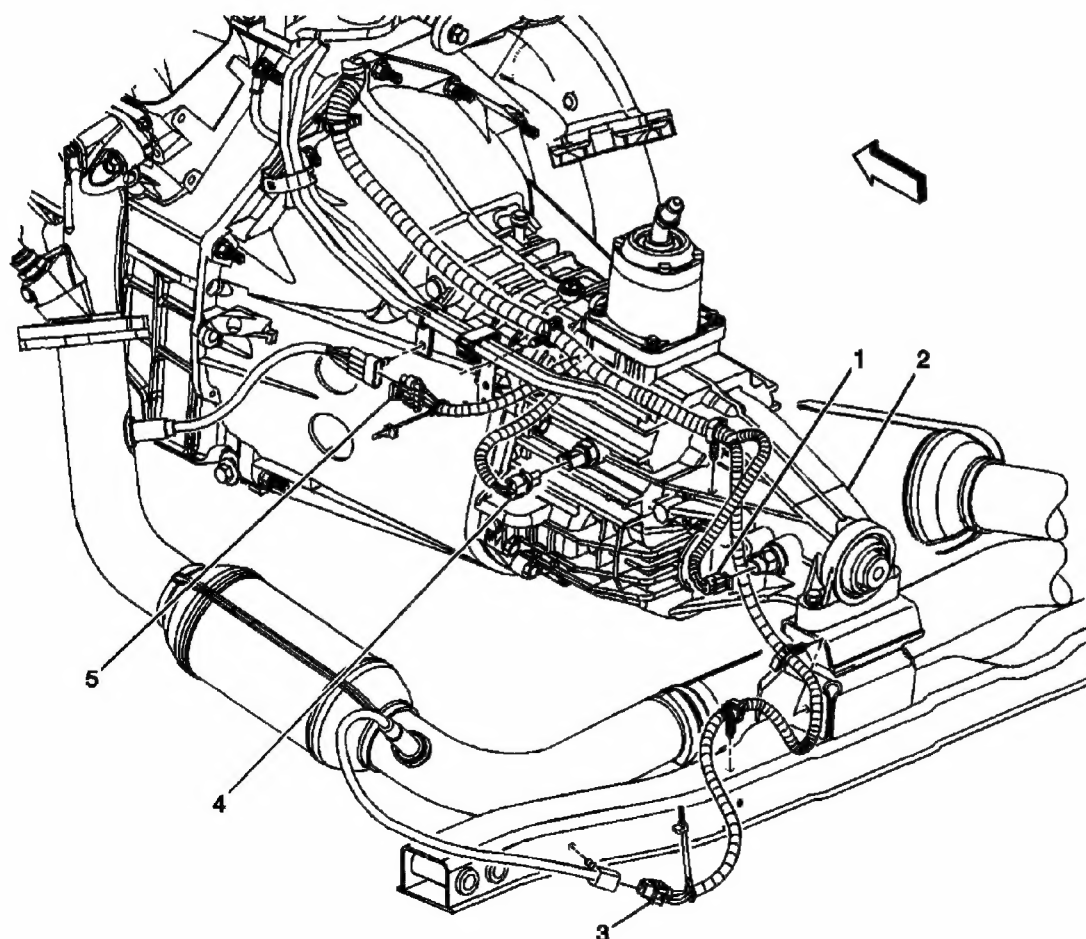
Fig. 2: Lubrication Specifications

COMPONENT LOCATOR

MANUAL TRANSMISSION COMPONENT VIEWS

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup



- (1) Vehicle Speed Sensor
- (2) NV 3500 Transmission
- (3) Oxygen Sensor Downstream Connector

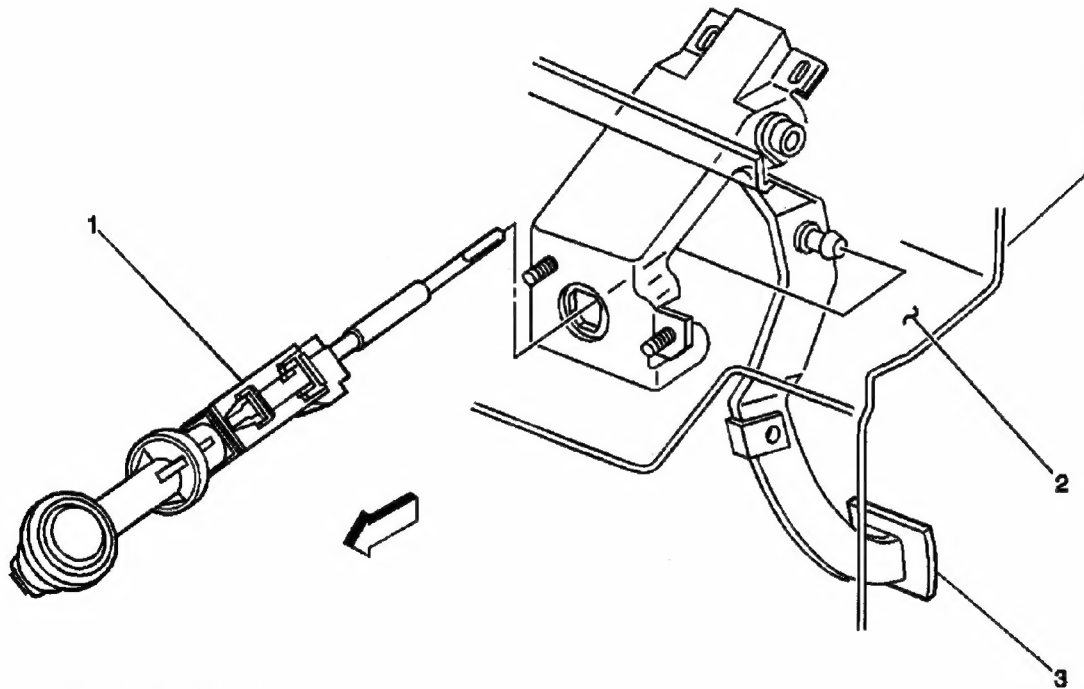
- (4) Backup Lamp Switch
- (5) Oxygen Sensor Upstream Connector

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Fig. 3: Locating Manual Transmission - NV 3500 Components

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup



(1) Clutch Start Switch
(2) Dash Panel

(3) Clutch Pedal

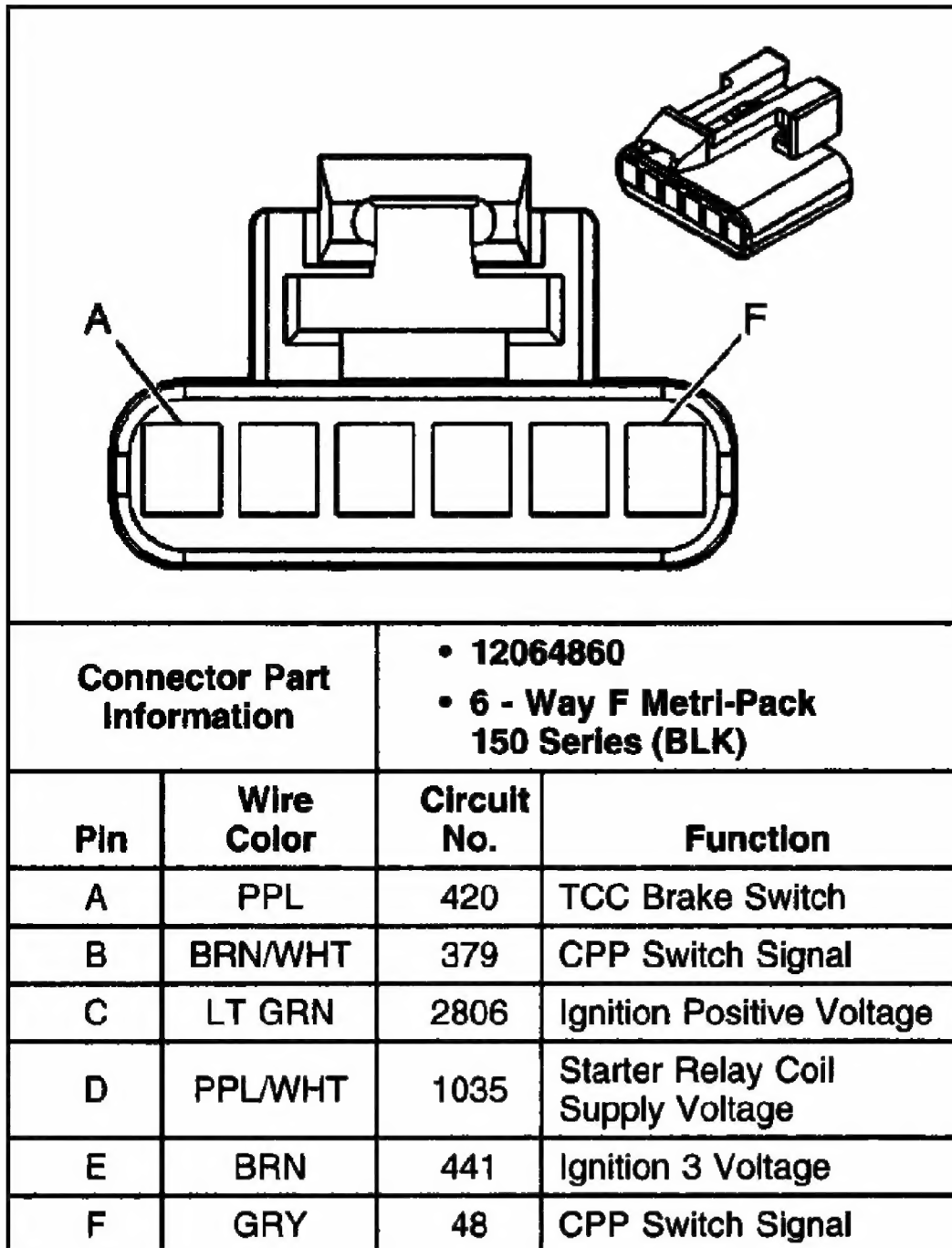
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Fig. 4: Locating Clutch Start Switch

MANUAL TRANSMISSION CONNECTOR END VIEWS

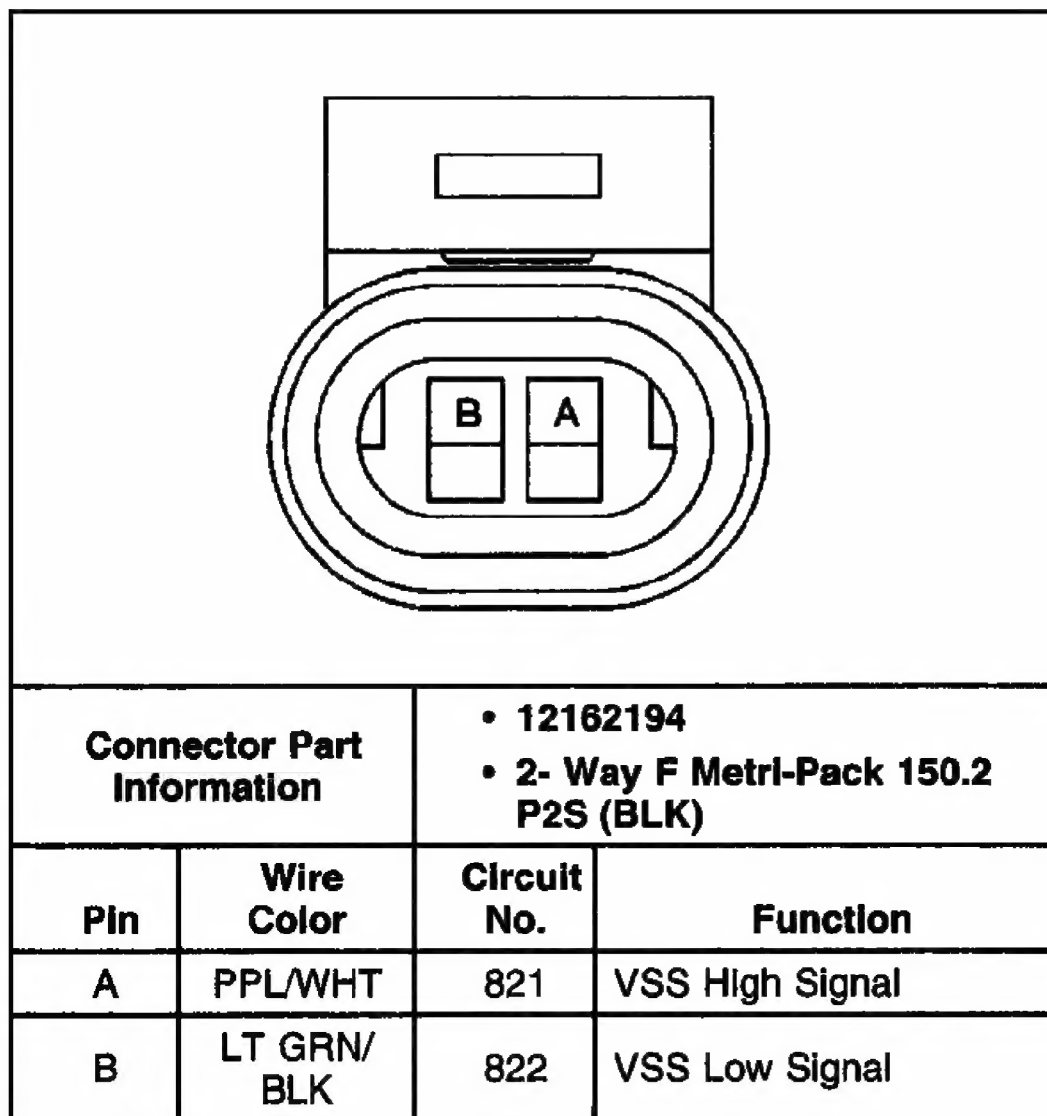
2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup



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Fig. 5: Identifying Clutch Start Switch Connector Terminals



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Fig. 6: Identifying Vehicle Speed Sensor Assembly Connector Terminals

DIAGNOSTIC INFORMATION & PROCEDURES

DIAGNOSTIC STARTING POINT - MANUAL TRANSMISSION

Begin the system diagnosis with **Diagnostic System Check - Manual Transmission**. The Diagnostic System Check - Manual Transmission will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification and the status of any stored diagnostic trouble codes (DTCs)

Use the **Diagnostic System Check - Manual Transmission** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - MANUAL TRANSMISSION

Description

The Diagnostic System Check is an organized approach to identifying a condition that is created by a malfunction in the electronic engine control system. The Diagnostic System Check must be the starting point for any driveability concern. The Diagnostic System Check directs the service technician to the next logical step in order to diagnose the concern. Understanding, and correctly using the diagnostic table reduces diagnostic time, and prevents the replacement of good parts.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 2) - Lack of communication may be because of a partial or a total malfunction of the Class 2 serial data circuit. The specified procedure determines the particular condition.
- 5) - This step stores the PCM DTC information into the scan tool's memory. After you complete the diagnostic procedure, review the captured information in order to catch the next DTC if the control module stores multiple DTCs. Review the Freeze Frame data and the Failure Records data. Use this information in order to determine how frequently and how recently the DTC set. This information may help diagnose an intermittent condition. Information about the operating conditions at the time that the DTC set may also help diagnose an intermittent condition. Capturing the stored information saves the data that the PCM loses during the following conditions:
 - When a diagnostic procedure instructs you to clear the DTCs
 - When a diagnostic procedure instructs you to disconnect the PCM connectors
 - When a diagnostic procedure instructs you to replace the PCM
- 6) - The presence of DTCs which begin with "U", indicate that some other module is not communicating. Following the specified procedure will gather all the available information before you perform the tests.
- 8) - If there are other modules with DTCs set, refer to the DTC list. The DTC list directs you to the appropriate diagnostic procedure.

If the control module stores multiple powertrain DTCs, diagnose the DTCs in the following order:

- Component level DTCs, such as sensor DTCs, solenoid DTCs, and relay DTCs. Diagnose the multiple DTCs within this category in numerical order. Begin with the lowest numbered DTC, unless the diagnostic table directs you otherwise.
- System level DTCs, for example, misfire DTCs, fuel trim DTCs, and catalyst

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

DTCs.

9) - This step is for areas that have inspection and maintenance testing procedures for emissions testing. Use this step if the testing facility found one or more I/M system statuses that did not set.

Step	Action	Yes	No
1	Important: <ul style="list-style-type: none"> Do not perform this diagnostic if there is not a driveability concern, unless another procedure directs you to this diagnostic. Before you proceed with diagnosis, search for applicable service bulletins. Unless a diagnostic procedure instructs you, do NOT clear the DTCs. If there is a condition with the starting system, refer to <i>Diagnostic System Check - Engine Electrical</i> in Engine Electrical. Ensure the battery has a full charge. Ensure the battery cables are clean and tight. Ensure the PCM grounds are clean, tight, and in the correct location. Install a <i>Scan Tool</i> . Does the <i>Scan Tool</i> turn ON?	Go to Step 2	Go to <i>Scan Tool Does Not Power Up</i> in Data Link Communications
2	1. Turn ON the ignition, with the engine OFF. 2. Attempt to establish communication with the listed control modules. If you are using a Tech 2, obtain the information using the Class 2 Message Monitor feature. <ul style="list-style-type: none"> PCM VTD IP Cluster EBCM HVAC Does the <i>Scan Tool</i> communicate with all the listed control modules?	Go to Step 3	Go to <i>Scan Tool Does Not Communicate with Class 2 Device</i> in Data Link Communications
3	Attempt to start the engine. Does the engine start and idle?	Go to Step 4	Go to <i>Engine Cranks but Does Not Run</i> (4.3 L) or <i>Engine Cranks but Does Not Run</i> (4.8 L) in Engine Controls
4	Select the DTC display function for the following control modules: <ul style="list-style-type: none"> PCM VTD IP Cluster EBCM HVAC Does the <i>Scan Tool</i> display any DTCs?	Go to Step 5	Go to Step 9
5	With a <i>Scan Tool</i> , select Captured Info in order to store the powertrain DTC information. Did you complete the action?	Go to Step 6	—
6	Does the <i>Scan Tool</i> display DTCs which begin with a "U"?	Go to <i>Scan Tool Does Not Communicate with Class 2 Device</i> in Data Link Communications	Go to Step 7

G01715267

Fig. 7: Diagnostic System Check - Manual Transmission (Steps 1-6)

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Step	Action	Yes	No
7	Does the <i>Scan Tool</i> display DTC P0601, P0602, P0604 or P0650, P1683?	Go to <i>DTC P0601-P0607, P1600, P1621, P1627, P1680, P1681, or P1683 or DTC P0650 (4.3 L) or DTC P0601-P0607, P1600, P1621, P1627, P1680, P1681, or P1683 or DTC P0650 (4.8 L) in Engine Controls</i>	Go to <i>Step 8</i>
8	Does the <i>Scan Tool</i> display DTC P0562, P0563, P1637, and P1638?	Go to <i>Diagnostic Trouble Code (DTC) List in Engine Electrical</i>	Go to <i>Diagnostic Trouble Code (DTC) List (4.3 L) or Diagnostic Trouble Code (DTC) List (4.8 L) in Engine Controls</i>
9	Is the customer concern with Inspection and Maintenance (I/M) testing?	Go to <i>Inspection/Maintenance (I/M) System Check (4.3 L) or Inspection/Maintenance (I/M) System Check (4.8 L) in Engine Controls</i>	Go to <i>Step 10</i>
10	1. Review the following symptoms. 2. Refer to the applicable symptom diagnostic table: <ul style="list-style-type: none"> • <i>Transmission Shifts Hard</i> • <i>Gear Clash When Shifting Gears</i> • <i>Transmission Noisy</i> • <i>Transmission Does Not Shift into One Gear</i> • <i>Transmission Jumps Out of Gear</i> • <i>Transmission Locked in One Gear</i> • <i>Clunk on Acceleration or Deceleration</i> Did you find and correct the condition?	System OK	Go to <i>Intermittent Conditions (4.3 L) or Intermittent Conditions (4.8 L) in Engine Controls</i>

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Fig. 8: Diagnostic System Check - Manual Transmission (Steps 7-10)

TRANSMISSION SCAN TOOL DATA LIST

The Transmission Scan Tool Data List contains manual transmission related parameters that are available on the Scan Tool . The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists, and in some cases may appear more than once, or in more than one data list in order to group certain related parameters together.

Use the Engine Scan Tool Data List only after the following is determined:

- The Diagnostic System Check - Engine Controls is completed.
- No diagnostic trouble codes (DTCs)
- On-board diagnostics are functioning properly.

Scan tool values from a properly running engine may be used for comparison with the engine you are diagnosing. The Engine Scan Tool Data List represents values that would be seen on a normal running engine.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Important: A **Scan Tool** that displays faulty data should not be used. The **Scan Tool** condition should be reported to the manufacturer. Use of a faulty **Scan Tool** can result in misdiagnosis and unnecessary parts replacement.

Only the parameters listed below are referenced in this service information for use in diagnosis. If all values are within the typical range described below, refer to symptoms in **SYMPTOMS (GASOLINE)** or **Symptoms - Manual Transmission** for diagnosis.

The column labeled Data List indicates where a parameter can be located on the Scan Tool. Refer to the scan tool operating manual for the exact locations of the data lists. The following is a description of each term listed:

All: The Parameter is in all of the data lists indicated below.

Eng 1: Engine Data 1 List

Eng 2: Engine Data 2 List

EE: Enhanced EVAP Data

FF/FR: Freeze Frame/Failure Records

FT: Fuel Trim Data List

Engine Idling/Radiator Hose Hot/Closed Throttle/Park or Neutral/Closed Loop/Accessories Off			
Scan Tool Parameter	Data List	Parameter Range/Units	Typical Data Values
Clutch Pedal Position Switch	Eng 1, 2	Depressed/Released	Released
Vehicle Speed	ENG 1, 2, EE, FT, FF, FR	km/h (mph)	0

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Fig. 9: Transmission Scan Tool Data List
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION SCAN TOOL DATA DEFINITIONS

The Transmission Scan Tool Data Definitions contain a brief description of manual transmission related parameters available on the scan tool. The list is in alphabetical order. A given parameter may appear in any one of the data lists. In some cases, the parameter may appear more than once or in more than one data list in order to group certain related parameters together.

Clutch Pedal Switch: The scan tool displays Depressed or Released. The scan tool displays Depressed when the vehicle clutch is applied. The scan tool displays Released when the

clutch pedal is released.

Vehicle Speed Sensor: The scan tool displays km/h and mph. The vehicle speed sensor signal is converted into km/h and mph for display on the scan tool.

DIAGNOSTIC TROUBLE CODE (DTC) TYPE DEFINITIONS

Diagnostic trouble codes (DTCs) are categorized into emissions and non-emissions related types. If a DTC is set, the malfunction indicator lamp (MIL) and failure data are utilized by the control module diagnostic executive according to the DTC type. Each DTC is set based upon the individual DTCs running and setting criteria. Read the Action Taken When the DTC Sets and Conditions for Clearing the MIL/DTC in the supporting text for taking appropriate action to each DTC.

Emissions Related DTCs

Type A

The following actions occur at the time of the first failure:

- The MIL is turned ON.
- A DTC is stored in memory.
- The Freeze Frame/Failure Records is stored.
- The Failure Records are updated after the first failure of each ignition cycle.

Some Type A DTCs will not perform the above actions when the DTC first detects a failure. Two consecutive failures are required. This allows systems, such as evaporative emission (EVAP), to accurately identify what failure exists before setting a DTC and requesting MIL illumination.

Type B

The following actions occur at one of the following times:

- First failure:
 - The MIL is not turned ON.
 - A DTC is stored in memory as a Failed Last Test.
 - The Failure Records is stored.
- Second consecutive drive cycle with a failure:
 - The MIL is turned ON.
 - A DTC is stored in memory as a history DTC.
 - The Freeze Frame data is stored.
 - The Failure Records is stored.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

- Second non-consecutive drive cycle with a failure:
 - The MIL is not turned ON.
 - A DTC is stored in memory as a Failed Last Test.
 - The Failure Records is stored.

Non-Emissions Related DTCs

Type C

The following actions occur at the time of a failure:

- The MIL does not turn ON.
- A DTC is stored in memory as a history DTC.
- The Failure Records is stored.
- The Failure Records are updated after the first failure of each ignition cycle.
- Some Type C DTCs may also cause an auxiliary service lamp to be illuminated, and/or display a message to the vehicle operator.

Type X

Actions did not occur. These DTCs are coded into the control module software, but will not run for one of the following reasons:

- The associated hardware is not installed with the vehicle emission package.
- The diagnostic is not required for the vehicle emission package.

DIAGNOSTIC TROUBLE CODE (DTC) LIST/TYPE

Description	Federal and California Emissions (NA5, NB6, NB7, NC1, NF2) Less than 8,600 GVW, 4.3 L L35 (VIN W) or 4.3 L LU3 (VIN X) (California Only)	Unleaded Fuel Export (NN8) 4.3 L L35 (VIN W)
DTC P0500	B	B
DTC P0704	B	C

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Fig. 10: Diagnostic Trouble Code (DTC) List/Type

DTC P0500

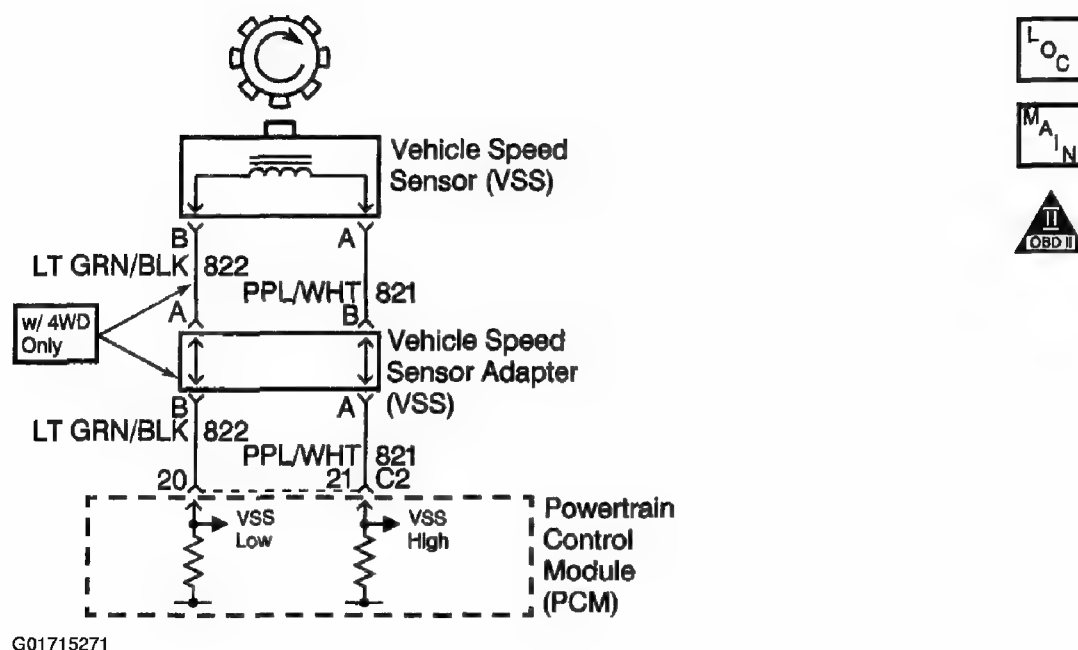


Fig. 11: Vehicle Speed Sensor (VSS) Schematic

Circuit Description

The vehicle speed sensor (VSS) assembly provides vehicle speed information to the powertrain control module (PCM). The VSS assembly is a permanent magnet generator. The VSS produces alternating current (AC) as the rotor teeth on the output shaft of the transmission (2WD) or transfer case (4WD) pass through the magnetic field of the sensor. The frequency and amplitude of the AC waveform increase as vehicle speed increases.

If the PCM detects no vehicle speed for a specified length of time, while other sensors indicate that the vehicle is moving, DTC P0500 sets. DTC P0500 is a type B DTC.

Conditions for Running the DTC

- No manifold absolute pressure (MAP) sensor DTCs P0106, P0107 or P0108.
- No throttle position (TP) or accelerator pedal position (APP) sensor DTCs P0121, P0122, P0123, P1120, P1125, P1220, P1221, P1514, P1515, P1516, P1517, or P1518.
- No crankshaft position sensor DTCs P0335 or P0336.
- The ECT is greater than 35°C (95°F).
- The TP sensor angle is 5-100 percent.
- The engine speed is greater than 1,000 RPM.
- The MAP is 40-100 kPa (6-15 psi).
- All of the above conditions are met for two seconds.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Conditions for Setting the DTC

The PCM detects no vehicle speed for 50 seconds.

Action Taken When the DTC Sets

- The PCM illuminates the malfunction indicator lamp (MIL) on the second consecutive drive trip that the diagnostic runs and fails.
- Cruise Control is disabled.
- The PCM records the operating conditions at the time when the Conditions for Setting the DTC are met. The PCM stores this information as Freeze Frame and Failure Records.
- The PCM stores P0500 in PCM history.

Conditions for Clearing the MIL/DTC

- The PCM turns OFF the MIL after three consecutive ignition cycles in which the diagnostic test runs and passes.
- The PCM cancels the DTC default actions when the fault no longer exists and the DTC passes.
- The PCM clears the DTC from PCM history If the vehicle completes 40 warm-up cycles without an emission-related diagnostic fault occurring.
- A Scan Tool can clear the MIL/DTC.

Diagnostic Aids

Ensure the VSS is correctly torqued to the transmission housing.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

5) - The resistance measurement will not change if either the VSS high signal circuit or the VSS low signal circuit, but not both, is shorted to ground. The vehicle speed detector in the PCM and the VSS are matched in such a way that an open or a short to ground in the VSS low signal circuit will not usually cause a loss of speed signal or a DTC P0500 to set. The lower resistance value given represents the nominal resistance specification of the VSS at -40°C (-40°F), minus the manufacturing tolerance specification of 10 percent. The higher resistance value given represents the nominal resistance specification of the VSS at 150°C (302°F), plus the manufacturing tolerance specification of 10 percent.

8) - This step isolates the short between the VSS and the wiring.

10) - Do not skip Step 7. The DMM will detect AC voltage if the VSS high signal circuit is shorted to ground.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

13) - The replacement PCM must be programmed and the crankshaft position system variation procedure must be performed. Refer to the latest Techline procedures for PCM reprogramming and to Powertrain Control Module (PCM) Programming in Engine Controls.

DTC P0500 Diagnostic Test

Step	Action	Value(s)	Yes	No
1	Did you perform the <i>Diagnostic System Check - Manual Transmission</i> ?	—	Go to Step 2	Go to <i>Diagnostic System Check - Manual Transmission</i>
2	<p>Notice: In order to avoid damage to the drive axles, support the lower control arms in the normal horizontal position. Do not run the vehicle in gear with the wheels hanging down at full travel.</p> <ol style="list-style-type: none"> 1. Install a <i>Scan Tool</i>. 2. Turn ON the ignition with the engine OFF. <p>Important: Record the Failure Records before clearing the DTCs. Using the Clear Info function erases the Failure Records from the PCM.</p> <ol style="list-style-type: none"> 3. Record the DTC Freeze Frame and Failure Records. 4. Clear the DTC. 5. Raise the drive wheels. 6. Start the engine. 7. Allow the engine to idle in gear. <p>Does the <i>Scan Tool</i> display vehicle speed above the specified value?</p>	0 mph	Go to Step 3	Go to Step 4
3	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Turn ON the ignition with the engine OFF. 3. Review the Freeze Frame data and note the parameters. 4. Start the engine. 5. Operate the vehicle within the Freeze Frame conditions and Conditions for Running the DTC. <p>Does the <i>Scan Tool</i> display vehicle speed above the specified value?</p>	0 mph	Go to <i>Intermittent Conditions (4.3 L)</i> or <i>Intermittent Conditions (4.8 L)</i> in Engine Controls	Go to Step 4
4	<ol style="list-style-type: none"> 1. Verify that the latest calibration is installed in the PCM. 2. Update the PCM with the latest calibration as necessary. <p>Did the PCM require a calibration update?</p>	—	Go to Step 14	Go to Step 5
5	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the PCM. 3. Measure the resistance between terminals C2 20 and C2 21. <p>Is the resistance within the specified range?</p>	966–2200 Ω	Go to Step 7	Go to Step 6

G01715272

Fig. 12: DTC P0500 Diagnostic Table (Steps 1-5)

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Step	Action	Value(s)	Yes	No
6	Test the VSS high signal circuit and the VSS low signal circuit for the following conditions: <ul style="list-style-type: none"> An open circuit or high resistance condition VSS high signal circuit and VSS low signal circuit shorted together Refer to <i>Circuit Testing</i> in <i>Wiring Systems</i> . Did you find and correct a condition?	—	Go to Step 14	Go to Step 11
7	Measure the resistance between terminal C2 21 and ground. Is the resistance greater than the specified value?	50 K Ω	Go to Step 10	Go to Step 8
8	1. Leave the <i>J 39200</i> digital multimeter (DMM) connected between terminal C2 21 and ground. 2. Disconnect the VSS. 3. Measure the resistance between terminal C2 21 and ground. Is the resistance greater than the specified value?	50 K Ω	Go to Step 11	Go to Step 9
9	Repair the short to ground in the VSS high signal circuit. Did you complete the repair?	—	Go to Step 14	—
10	1. Reconnect the <i>J 39200</i> DMM between terminal C2 20 and C2 21. 2. Measure the AC voltage with the <i>J 39200</i> DMM while rotating the drive wheels by hand. Is the AC voltage equal to or greater than the specified value?	0.5 V	Go to Step 13	Go to Step 11
11	1. Remove the VSS. Refer to <i>Vehicle Speed Sensor (VSS)</i> . 2. Inspect the VSS and the VSS rotor for the following conditions: <ul style="list-style-type: none"> VSS damage VSS rotor damage Excessive air gap between the VSS rotor and the VSS Incorrect alignment between the VSS and the VSS rotor 3. Repair or replace any of the above items as necessary. Did you find and correct a condition?	—	Go to Step 14	Go to Step 12
12	Replace the VSS. Refer to <i>Vehicle Speed Sensor (VSS)</i> . Did you complete the repair?	—	Go to Step 14	—
13	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) Replacement</i> . Is the action complete?	—	Go to Step 14	—
14	1. Using the <i>Scan Tool</i> , clear the DTCs. 2. Start the engine. 3. Idle at normal operating temperature. 4. Operate the vehicle within the Conditions for Running the DTC, as specified in the supporting text. Does the <i>Scan Tool</i> indicate that this diagnostic has run and passed?	—	System OK	Go to Step 2

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Fig. 13: DTC P0500 Diagnostic Table (Steps 6-14)

DTC P0704

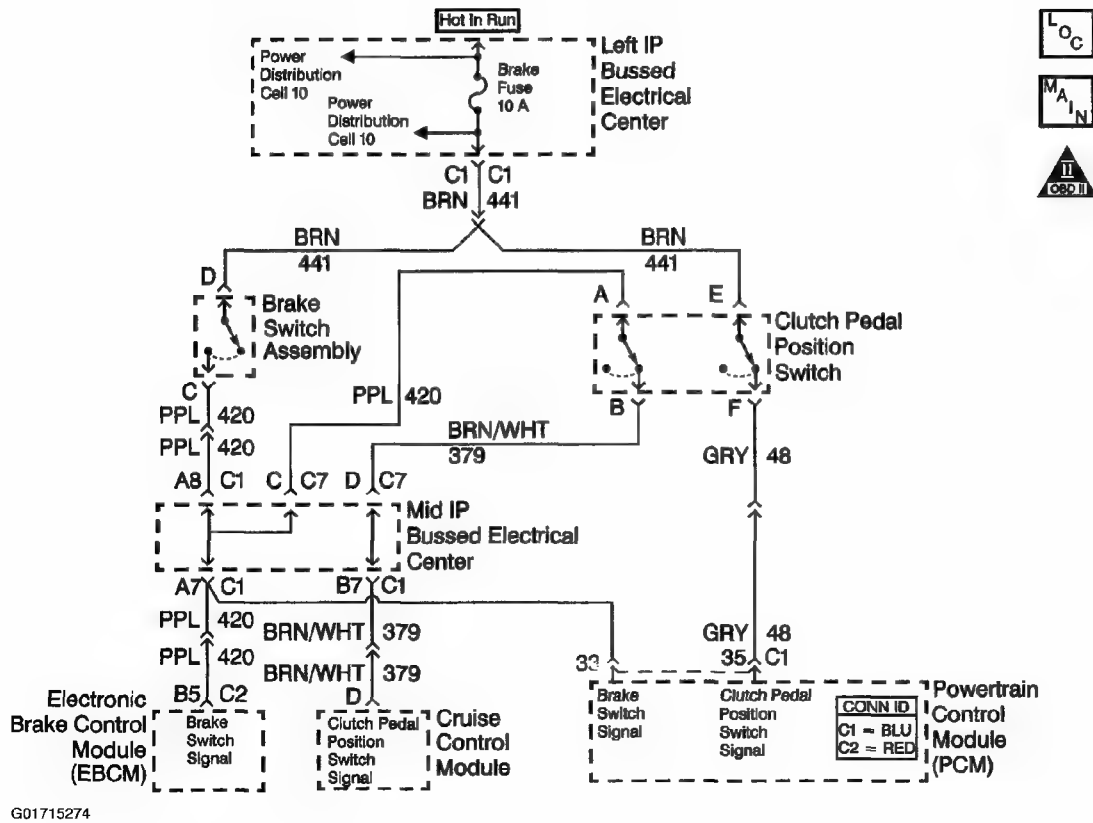


Fig. 14: Clutch Pedal Position Switch Schematic

Circuit Description

Battery voltage is supplied from the brake fuse to the clutch switch. The clutch switch is a normally-closed switch. When the clutch pedal is released, the clutch pedal position switch signal circuit is pulled up to B+. When the clutch pedal is applied, the switch opens, and the voltage drops to 0 volts.

If the powertrain control module (PCM) detects a specified number of vehicle speed transitions without detecting a clutch switch transition, DTC P0704 will set. DTC P0704 is a type B DTC.

Conditions for Running the DTC

No vehicle speed sensor (VSS) DTC P0500.

Conditions for Setting the DTC

The PCM detects 7 changes in vehicle speed between 0 and 38 km/h (0-24 mph) without the PCM detecting a clutch pedal transition.

Action Taken When the DTC Sets

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

- California Vehicles- The PCM illuminates the malfunction indicator lamp (MIL) during the second consecutive trip in which the Conditions for Setting the DTC are met.
- Federal Vehicles - The PCM does not illuminate the MIL.
- The PCM disables cruise control.
- The PCM disables power take-off.
- The PCM records the operating conditions when the Conditions for Setting the DTC are met. The PCM records this information as Freeze Frame and Failure Records.
- The PCM stores DTC P0704 in PCM history.

Conditions for Clearing the MIL/DTC

- The PCM turns OFF the MIL during the third consecutive trip in which the diagnostic test runs and passes.
- The PCM cancels the DTC default actions when the ignition switch is OFF long enough in order to power down the PCM.
- A history DTC clears after 40 consecutive warm-up cycles, if no failures are present by this diagnostic or any other emission-related diagnostic.
- A Scan Tool can clear the MIL/DTC.

DTC P0704 Diagnostic Test

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Step	Action	Value(s)	Yes	No
1	Did you perform the <i>Diagnostic System Check - Manual Transmission</i> ?	—	Go to Step 2	Go to <i>Diagnostic System Check - Manual Transmission</i>
2	<ol style="list-style-type: none"> 1. Install a <i>Scan Tool</i>. 2. Turn ON the ignition, with the engine OFF. 3. Use the <i>Scan Tool</i> to monitor the clutch pedal position switch parameter. 4. Apply and release the clutch pedal several times. Does the <i>Scan Tool</i> indicate a change in state when the clutch pedal is either applied or released?	—	Go to <i>Intermittent Conditions (4.3 L)</i> or <i>Intermittent Conditions (4.8 L)</i> in Engine Controls	Go to Step 3
3	Inspect the adjustment of the clutch pedal position switch. Refer to <i>Clutch Start Switch Replacement</i> in Clutch. Did you find and correct a condition?	—	Go to Step 14	Go to Step 4
4	<ol style="list-style-type: none"> 1. Turn OFF the ignition. Caution: When you are performing service on or near the SIR components or the SIR wiring, you must disable the SIR system. Refer to <i>Disabling the SIR System</i>. Failure to follow the correct procedure could cause air bag deployment, personal injury, or unnecessary SIR system repairs. <ol style="list-style-type: none"> 2. Disconnect the clutch pedal position switch connector. 3. Measure the voltage between Pin E of the clutch pedal position switch electrical connector and a good ground. Does the <i>J 39200</i> digital multimeter (DMM) indicate the specified value?	B+	Go to Step 5	Go to Step 11
5	<ol style="list-style-type: none"> 1. Use a fused jumper wire to connect Pin E and Pin F of the clutch pedal position switch electrical connector. 2. Turn ON the ignition, with the engine OFF. 3. Use the <i>Scan Tool</i> to monitor the clutch pedal position switch parameter. Does the <i>Scan Tool</i> display that the clutch is released?	—	Go to Step 8	Go to Step 6
6	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the PCM connector C1. Refer to <i>Powertrain Control Module (PCM) Replacement</i>. 3. Use the <i>J 39200</i> digital multimeter (DMM) in order to test for continuity on the clutch pedal switch signal circuit (CKT 48) between Pin F of the clutch pedal position switch and Pin 35 of PCM connector C1. Refer to <i>Testing for Continuity</i> in Wiring Systems. Did you detect continuity?	—	Go to Step 7	Go to Step 10
7	Use the <i>J 39200</i> DMM in order to test for continuity between Pin F of the clutch pedal position switch and a good ground. Refer to <i>Testing for Continuity</i> in Wiring Systems. Did you detect continuity?	—	Go to Step 10	Go to Step 9
8	<ol style="list-style-type: none"> 1. Inspect for a loose connection at the clutch pedal position switch connector. Refer to <i>Testing for Intermittent and Poor Connections</i> in Wiring Systems. 2. Repair the condition as necessary. Refer to <i>Connector Repairs</i> in Wiring Systems. Did you find and correct the condition?	—	Go to Step 14	Go to Step 12

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Fig. 15: DTC P0704 Diagnostic Table (Steps 1-8)

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Step	Action	Value(s)	Yes	No
9	1. Inspect for a loose connection at the PCM. Refer to <i>Testing for Intermittent and Poor Connections</i> in Wiring Systems. 2. Repair the condition as necessary. Refer to <i>Connector Repairs</i> in Wiring Systems. Did you find and correct the condition?	—	Go to Step 14	Go to Step 13
10	Repair the open or short to ground in the clutch position switch signal circuit (CKT 48). Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the action complete?	—	Go to Step 14	—
11	Repair the open in the clutch position switch feed circuit (CKT 441). Refer to <i>Wiring Repairs</i> in Wiring Systems. Is the action complete?	—	Go to Step 14	—
12	Replace the clutch pedal position switch. Refer to <i>Clutch Start Switch Replacement</i> in Clutch. Is the action complete?	—	Go to Step 14	—
13	Replace the PCM. Refer to <i>Powertrain Control Module (PCM) Replacement</i> . Is the action complete?	—	Go to Step 14	—
14	1. Select the DTC. 2. Select Clear Info. 3. Operate the vehicle within the Conditions for Running the DTC, as specified in the supporting text. 4. Select Specific DTC. 5. Enter DTC P0704. Has the test run and passed?	—	System OK	Go to Step 1

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Fig. 16: DTC P0704 Diagnostic Table (Steps 9-14)

SYMPTOMS - MANUAL TRANSMISSION

Strategy Based Diagnostics

Review the system operations in order to familiarize yourself with the system functions. Refer to **Transmission System Description & Operation** .

Visual/Physical Inspection

- Inspect the manual transmission for excessive wear or damage.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the manual transmission for the correct fluid level.
- Inspect the manual transmission for fluid leaks.
- Inspect the manual transmission for broken or loosen transmission mounts.

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating properly.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the

symptom:

- See Transmission Shifts Hard .
- See Transmission Shifts Hard Into Reverse .
- See Gear Clash When Shifting Gears .
- See Transmission Noisy .
- See Transmission Does Not Shift Into One Gear .
- See Transmission Locked In One Gear .
- See Transmission Jumps Out Of Gear .
- See Clunk On Acceleration Or Deceleration .

TRANSMISSION SHIFTS HARD

Diagnostic Aids

Hard shifting can be diagnosed easily. You should also perform a static shift and a dynamic shift test. Many simple factors could occur such as excessive clutch pedal free travel, insufficient fluid, excessive fluid or even the wrong transmission lubricant. A misaligned transmission can also cause hard shifting as well as a worn or defective clutch, binding of the shift control. Many internal components can also play a factor in hard shifting such as the front bearing retainer loose or cracked, synchronizer worn, damaged or improperly assembled. A failure to fully depress the clutch pedal when shifting will cause hard shifting.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 4) - This step checks for air in the hydraulic lines, this will also cause the transmission to hard shift.
- 6) - This step checks for a faulty shift control.
- 10) - This step checks for a faulty or worn clutch pressure plate or clutch driven plate.

Diagnostic Test

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Step	Action	Yes	No
DEFINITION: The transmission does not shift smoothly or without difficulty into another gear.			
1	Did you review the manual transmission symptom operations and perform the necessary inspections?	Go to Step 2	Go to Symptoms - <u>Manual Transmission</u>
2	Inspect the clutch pedal travel. Is there sufficient clutch pedal travel?	Go to Step 3	Go to Step 4
3	Remove any clutch pedal restrictions. Does the transmission shift hard?	Go to Step 4	System OK
4	Test for air in the clutch hydraulic system. Is there air in the hydraulic system?	Go to Step 5	Go to Step 6
5	Bleed the air from the clutch hydraulic system. Refer to <u>Hydraulic Clutch Bleeding</u> in Clutch. Did you find and repair the condition?	System OK	Go to Step 6

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Fig. 17: Transmission Shifts Hard Diagnostic Table (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

6	Inspect the transmission shift control for binding. Is the transmission shift control binding?	Go to <u>Step 7</u>	Go to <u>Step 8</u>
7	Replace the transmission shift tower. Refer to <u>Shift Tower Replacement</u> . Did you find and repair the condition?	System OK	Go to <u>Step 7</u>
8	Check the transmission for the correct type transmission fluid. Is the correct type fluid being used?	Go to <u>Step 10</u>	Go to <u>Step 9</u>
9	Drain and refill the transmission with the correct type fluid. Did you find and repair the condition?	System OK	Go to <u>Step 10</u>
10	Inspect the clutch pressure pate and/or clutch driven plate. Is the clutch pressure plate and/or clutch driven plate worn or faulty?	Go to <u>Step 11</u>	Go to <u>Step 12</u>
11	Replace the clutch pressure plate and/or clutch driven plate. Refer to <u>Clutch Assembly Replacement</u> in Clutch. Did you find and repair the condition?	System OK	Go to <u>Step 12</u>
12	Remove the transmission. Refer to <u>Transmission Replacement</u> . Inspect the transmission for an internal bind, possibly caused by one of the following: <ul style="list-style-type: none">• Shift forks• Selector plates• Synchronizers Is there an internal bind?	Go to <u>Step 13</u>	System OK
13	1. Replace worn or damaged components as necessary. Refer to Transmission/Transaxle/Transfer Case Unit Repair Manual. 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	Go to <u>Step 14</u>	Go to Diagnostic Aids
14	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to <u>Step 1</u>

G00250041

Fig. 18: Transmission Shifts Hard Diagnostic Table (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION SHIFTS HARD INTO REVERSE.

Diagnostic Aids

Hard shifting in reverse can be diagnosed easily. You should also perform a static shift and a dynamic shift test. Many simple factors could occur such as excessive clutch pedal free travel, insufficient fluid, excessive fluid or even the wrong transmission lubricant. A

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

misaligned transmission can also cause hard shifting as well as a worn or defective clutch, binding of the shift control. Many internal components can also play a factor in hard shifting such as the front bearing retainer loose or cracked, synchronizer worn, damaged or improperly assembled. A failure to fully depress the clutch pedal when shifting will cause hard shifting in reverse.

Test Description

The number(s) below refer to the step number(s) on the diagnostic table.

- 4) - This step checks for air in the hydraulic lines, this will also cause the transmission to hard shift in reverse.
- 6) - This step checks for a faulty shift control.
- 10) - This step checks for a faulty or worn clutch pressure plate or clutch driven plate.

Diagnostic Test

Step	Action	Yes	No
DEFINITION: The transmission does not shift smoothly or without difficulty into reverse gear.			
1	Did you review the manual transmission symptom operations and perform the necessary inspections?	Go to Step 2	Go to <u>Symptoms - Manual Transmission</u>
2	Inspect the clutch pedal travel. Is there sufficient clutch pedal travel?	Go to Step 3	Go to Step 4
3	Remove any clutch pedal restrictions. Does the transmission shift hard in reverse?	Go to Step 4	System OK
4	Test for air in the clutch hydraulic system. Is there air in the hydraulic system?	Go to Step 5	Go to Step 6
5	Bleed the air from the clutch hydraulic system. Refer to <u>Hydraulic Clutch Bleeding in Clutch</u> . Did you find and repair the condition?	System OK	Go to Step 6

G00250042

Fig. 19: Transmission Shifts Hard Into Reverse Diagnostic Table (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

6	Inspect the transmission shift control for binding. Is the transmission shift control binding?	Go to Step 7	Go to Step 8
7	Replace the transmission shift tower. Refer to <u>Shift Tower Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 8
8	Inspect the transmission for the correct type transmission fluid. Is the correct type fluid being used?	Go to Step 10	Go to Step 9
9	Drain and refill the transmission with the correct type fluid. Did you find and repair the condition?	System OK	Go to Step 10
10	Inspect the clutch pressure pate and/or clutch driven plate. Is the clutch pressure plate and/or clutch driven plate worn or faulty?	Go to Step 11	Go to Step 12
11	Replace the clutch pressure plate and/or clutch driven plate. Refer to <u>Clutch Assembly Replacement</u> in Clutch. Did you find and repair the condition?	System OK	Go to Step 12
12	Remove the transmission. Refer to <u>Transmission Replacement</u> . Inspect the transmission for an internal bind, possibly caused by one of the following: <ul style="list-style-type: none">• Shift forks• Selector plates• Synchronizers Is there an internal bind?	Go to Step 13	System OK
13	1. Replace worn or damaged components as necessary. 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	Go to Step 14	Go to Diagnostic Aids
14	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

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Fig. 20: Transmission Shifts Hard Into Reverse Diagnostic Table (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

GEAR CLASH WHEN SHIFTING GEARS

Diagnostic Aids

Gear clash is a grinding noise that is made when shifting gears. You should also perform a static shift and a dynamic shift test. If the transmission develops gear clash, first check the clutch adjustment or faulty clutch condition. A clutch that drags or does not fully engage is

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

the most common cause of gear clash. If the clutch is at fault, the clash should occur in every gear. If the clutch is all right, or the clash does not occur in all gears, check for worn or damaged synchronizers, including the sleeves, hubs and the blocking rings. Also check for loose mounting bolts or misalignment.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 2) - This step checks for proper clutch operations.
- 5) - This step checks for air the hydraulic clutch system.
- 12) - This step checks for worn or damaged internal components.

Diagnostic Test

Step	Action	Yes	No
DEFINITION: The transmission gears clash when shifting from one gear into another gear.			
1	Did you review the manual transmission symptoms and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Manual Transmission
2	Inspect for proper clutch operation. Refer to Symptoms - Clutch in Clutch. Does the clutch operate properly?	Go to Step 3	Go to Step 3
3	Verify that the clutch is releasing properly. Refer to Hydraulic Clutch Description in Clutch. Is the clutch releasing properly?	Go to Step 5	Go to Step 4
4	Repair the clutch system. Refer to Clutch Assembly Replacement in Clutch. Did you find and repair the condition?	System OK	Go to Step 5
5	Test for air in the clutch hydraulic system. Is there air in the hydraulic system?	Go to Step 6	Go to Step 7

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Fig. 21: Gear Clash When Shifting Gears Diagnostic Table (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

6	Bleed the clutch hydraulic system. Refer to <u>Hydraulic Clutch Bleeding in Clutch</u> . Did you find and repair the condition?	System OK	Go to Step 7
7	Inspect the transmission control for wear. Is the transmission control worn?	Go to Step 8	Go to Step 9
8	Replace the transmission shift tower. Refer to <u>Shift Tower Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 9
9	Inspect the transmission fluid level. Refer to <u>Fluid Replacement</u> . Do the gears still clash?	Go to Step 9	System OK
10	Inspect for the correct type transmission fluid. Is the correct type transmission fluid being used?	Go to Step 12	Go to Step 11
11	Drain and refill the transmission. Refer to <u>Fluid Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 12
12	1. Remove the transmission. Refer to <u>Transmission Replacement</u> . 2. Disassemble and inspect the gear shift components and/or synchronizers for damage or wear. Are the gear shift and/or synchronizers worn or damaged?	Go to Step 13	Go to Step 14
13	1. Replace worn and/or damaged components as necessary. 2. Inspect for other gear train damaged components as necessary. Did you find and repair the condition?	System OK	Go to Step 14
14	Inspect the clutch pilot bearing for binding. Is the pilot bearing binding?	Go to Step 15	System OK
15	1. Replace the clutch pilot bearing. Refer to <u>Pilot Bearing Replacement in Clutch</u> . 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	Go to Step 16	Go to Diagnostic Aids
16	Operate the system and verify the repair. Did you correct the condition?	System OK	Go to Step 1

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Fig. 22: Gear Clash When Shifting Gears Diagnostic Table (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION NOISY

Diagnostic Aids

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

The manual transmission can be noisy for a number of reason, from being noisy in neutral, low, high and reverse gear. Diagnose the transmission from the level of fluid to the right type of fluid in the transmission. Inspect for misalignment or loose bolts to the engine. The transmission could be noisy internally from the gears, synchronizers, bearings this should be inspected for worn or damaged parts. These are only a few areas that may cause the transmission to be noisy, you should inspect all possibilities that could lead you to the noise of these concerns.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 2) - This step is checking for the correct fluid level.
- 4) - This step is checking for the correct type of transmission fluid.
- 10) - This step is checking for internal damage or worn parts.

Diagnostic Test

Step	Action	Yes	No
DEFINITION: The transmission is noisy and the nose carries into the passenger compartment.			
1	Did you review the manual transmission symptom operations and perform the necessary inspections?	Go to Step 2	Go to <u>Symptoms - Manual Transmission</u>
2	Inspect the transmission fluid level. Is the fluid level correct?	Go to Step 4	Go to Step 3
3	Add transmission fluid. Refer to <u>Fluid Replacement</u> . Is the transmission noisy?	Go to Step 4	System OK
4	Inspect the transmission for the correct fluid type. Is the transmission fluid the correct type?	Go to Step 6	Go to Step 5
5	Drain and refill the transmission with the correct type fluid. Refer to <u>Fluid Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 6
6	Inspect the shift control closeout boot. Is the closeout boot loose or damaged?	Go to Step 7	Go to Step 8

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Fig. 23: Transmission Noisy Diagnostic Table (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

7	Position and tighten the shift tower to specification, or replace the boot as necessary. Refer to <u>Shift Tower Replacement</u> . Did you find and repair the condition?	System OK	Go to <u>Step 8</u>
8	Inspect the clutch housing for loose bolts and/or misalignment with the engine. Is there any loose bolts or misalignment with the engine?	Go to <u>Step 9</u>	Go to <u>Step 10</u>
9	Tighten the clutch housing bolts to specifications. Refer to <u>Fastener Tightening Specifications in Clutch</u> . Did you find and repair the condition?	System OK	Go to <u>Step 10</u>
10	1. Remove the transmission. Refer to <u>Transmission Replacement</u> . 2. Disassemble and inspect the following transmission components for wear or damage: - Gear shift - Transmission gears - Bearings Is there any wear or damage?	Go to <u>Step 11</u>	System OK
11	1. Replace worn or damaged components as necessary. Refer to <u>Transmission/Transaxle/Transfer Case Unit Repair Manual</u> . 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	Go to <u>Step 12</u>	Go to Diagnostic Aids
12	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to <u>Step 1</u>

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Fig. 24: Transmission Noisy Diagnostic Table (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION DOES NOT SHIFT INTO ONE GEAR

Diagnostic Aids

When the manual transmission will not transmit power from the engine to the wheels and one gear will not shift it is possible that the gear is stripped. If the transmission will not shift in all gears it is possible that the input or countershaft gears are stripped or a broken input or output shaft has occurred. Sometimes the transmission shift control may not be working correctly. You should also perform a static shift and a dynamic shift test.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2) - This step checks for worn or damage shift control components.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

4) - This step inspects for any problems with the hydraulic system.

8) - This step inspects for internal parts that may have worn or damaged components.

Diagnostic Test

Step	Action	Yes	No
DEFINITION: The transmission does not shift into a gear.			
1	Did you review the manual transmission symptom and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Manual Transmission
2	Inspect the operation of the transmission shift lever. Is the control worn, binding, or damaged?	Go to Step 3	Go to Step 3
3	Replace the transmission shift lever. Refer to <u>Shift Lever Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 4
4	Inspect the hydraulic clutch operation. Refer to <u>Symptoms - Clutch in Clutch</u> . Is the clutch operating properly?	Go to Step 6	Go to Step 5
5	Replace the concentric slave cylinder. Refer to <u>Concentric Slave Cylinder in Clutch</u> . Did you find and repair the condition?	System OK	Go to Step 6
6	1. Remove the transmission. Refer to <u>Transmission Replacement</u> . 2. Inspect the transmission input shaft and the clutch pilot bearing. Is there signs of the input shaft binding in the pilot bearing?	Go to Step 7	Go to Step 8
7	1. Inspect the pilot bearing for damaged. Replace the clutch pilot bearing. Refer to <u>Pilot Bearing Replacement</u> 2. Will the transmission shift into gear? Did you find and repair the condition?	System OK	Go to Step 8
8	Disassemble and inspect the following transmission internal components for wear or damage: <ul style="list-style-type: none">• Gearshift components• Transmission gears• Bearings Are any of the components worn or damaged?	Go to Step 9	System OK
9	1. Replace all worn or damaged components. 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	Go to Step 10	Go to Diagnostic Aids
10	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

Fig. 25: Transmission Does Not Shift Into One Gear Diagnostic Table
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION JUMPS OUT OF GEAR

Diagnostic Aids

The manual transmission can have a number of problems to make it jump out of gear. You should also perform a static shift and a dynamic shift test. Some of the most common ones are misalignment of the transmission to engine, the clutch housing loose, or misalignment. The transmission should also be checked for worn or damaged input bushing to flywheel or worn or damaged input and output shaft bearings. An bent input shaft could also be the result of the transmission jumping out of gear. When going into the internal part of the transmission also check for worn detent springs, synchronizers, worn teeth on the gears or even worn thrust washers. When doing inspections of the manual transmission you should inspect all internal parts for worn or damaged parts.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 2) - This step is inspecting for the position of the shift control closeout boot.
- 6) - This step checks for worn or damaged transmission or engine mounts.
- 12) - This step is checking for worn or damaged internal parts.

Diagnostic Test

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Step	Action	Yes	No
DEFINITION: Gear disengagement occurs during normal operation.			
1	Did you review the manual transmission symptom operations and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Manual Transmission
2	Inspect the transmission shift tower. Is the boot out of position?	Go to Step 3	Go to Step 3
3	Reposition or replace the shift tower. Refer to <u>Shift Tower Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 4
4	Inspect the transmission shift control. Is the shift lever loose or damaged?	Go to Step 5	Go to Step 6
5	Replace the transmission shift lever. Refer to <u>Shift Lever Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 6

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Fig. 26: Transmission Jumps Out Of Gear Diagnostic Table (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

6	Inspect the engine and/or transmission mounts. Are the engine and/or transmission mounts worn or damaged?	Go to Step 7	Go to Step 8
7	Replace the engine mounts and/or transmission mounts. Did you find and repair the condition?	System OK	Go to Step 8
8	Inspect the engine and/or transmission mounts for loose fasteners. Are there any loose fasteners?	Go to Step 9	Go to Step 10
9	Tighten the engine mount and/or transmission mount fasteners to specifications. Refer to <u>Fastener Tightening Specifications</u> . Did you find and repair the condition?	System OK	Go to Step 10
10	Inspect the clutch housing for loose bolts or misalignment. Are there any loose bolts or misalignment?	Go to Step 11	Go to Step 12
11	Tighten any loose housing bolts and/or align the housing . Refer to <u>Fastener Tightening Specifications</u> in Clutch. Did you find and repair the condition?	System OK	Go to Step 12
12	1. Remove the transmission. Refer to <u>Transmission Replacement</u> . 2. Disassemble and inspect the following internal components for wear or damage: - Gearshift - Transmission gears - Bearings Is there any worn or damaged components?	Go to Step 13	System OK
13	1. Replace any worn or damaged components. . 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	Go to Step 14	Go to Diagnostic Aids
14	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

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Fig. 27: Transmission Jumps Out Of Gear Diagnostic Table (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION LOCKED IN ONE GEAR

Diagnostic Aids

If the transmission is locked, engaging the clutch will kill the engine. If the shift control components and the clutch system operations are working properly, the problem is caused by internal damage, such as a dented or damaged shift fork, and the transmission must be removed from the vehicle for repairs. You should also perform a static shift and a dynamic

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

shift test.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 6) - This step is checking for a faulty actuator cylinder.
- 8) - This step is checking for a dented or damaged shift fork.
- 12) - This step is checking for worn or damaged internal components.

Diagnostic Test

Step	Action	Yes	No
DEFINITION: The transmission cannot be shifted out of a gear.			
1	Did you review the manual transmission symptom and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Manual Transmission
2	Inspect the transmission fluid level. Refer to Fluid Replacement . Is the transmission fluid level correct?	Go to Step 4	Go to Step 3
3	Add transmission fluid if necessary. Can the transmission be shifted out of gear?	System OK	Go to Step 5
4	Inspect for the correct type transmission fluid. Is the correct type transmission fluid being used?	Go to Step 6	Go to Step 5
5	Drain and refill the transmission with the correct type fluid. Refer to Fluid Replacement . Did you find and repair the condition?	System OK	Go to Step 6
6	Inspect the concentric slave cylinder operation. Refer to Symptoms - Clutch in Clutch. Is the clutch actuator operating properly?	Go to Step 8	Go to Step 7

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Fig. 28: Transmission Locked In One Gear Diagnostic Table (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

7	Replace the concentric slave cylinder. Refer to <u>Concentric Slave Cylinder</u> in Clutch. Did you find and repair the condition?	System OK	Go to Step 8
8	1. Remove the transmission. Refer to <u>Transmission Replacement</u> . 2. Disassemble and inspect the transmission for a dented or damaged shift fork. Is there a dented or damaged shift fork?	Go to Step 9	Go to Step 10
9	1. Replace the worn or damaged components as necessary. 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 10
10	Disassemble and inspect the transmission for a incorrectly assembled or broken shift mechanism. Is there an incorrectly assembled or broken shift mechanism?	Go to Step 11	System OK
11	1. Replace worn or damaged components as necessary. 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	Go to Step 12	Go to Diagnostic Aids
12	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

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Fig. 29: Transmission Locked In One Gear Diagnostic Table (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

CLUNK ON ACCELERATION OR DECELERATION

Diagnostic Aids

There are a few factors to know when there is a clunk in acceleration or deceleration. You should always check the engine mounts for looseness or damage. Also check the clutch driven plate to see if it is worn or damaged. Sometimes the clunk noise may come from worn or damaged universal joints.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 2) - This step inspects for loose or damaged engine mounts.
- 4) - This step inspects for worn or damaged driven clutch plate.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

6) - This step inspects for worn or damaged universal joints.

Diagnostic Test

Step	Action	Yes	No
DEFINITION: A clunk is heard and/or felt on acceleration or deceleration.			
1	Did you review the manual transmission symptom and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Manual Transmission
2	Inspect the engine mounts for looseness or damage. Refer to <u>Engine Mount Inspection</u> . Are the engine mounts loose or damaged?	Go to Step 3	Go to Step 4
3	1. Tighten the engine mounts to specifications. Refer to <u>Fastener Tightening Specifications</u> in Engine Mechanical - 5.7 L. 2. Replace the engine mounts. Did you find and repair the condition?	System OK	Go to Step 4
4	1. Remove the transmission. Refer to <u>Transmission Replacement</u> . 2. Inspect the clutch driven plate hub for wear or damage. Is the clutch driven plate worn or damaged?	Go to Step 5	System OK
5	1. Replace the clutch driven plate. Refer to <u>Clutch Assembly Replacement</u> in Clutch. 2. Install the transmission. Refer to <u>Transmission Replacement</u> . Did you find and repair the condition?	System OK	Go to Step 6
6	Inspect the universal joints for wear or damage. Are the universal joints worn or damaged?	Go to Step 7	System OK
7	Replace the universal joints. Did you find and repair the condition?	Go to Step 8	Go to Diagnostic Aids
8	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 1

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Fig. 30: Transmission Clunk On Acceleration Or Deceleration Diagnostic Table
Courtesy of GENERAL MOTORS CORP.

REPAIR INSTRUCTIONS

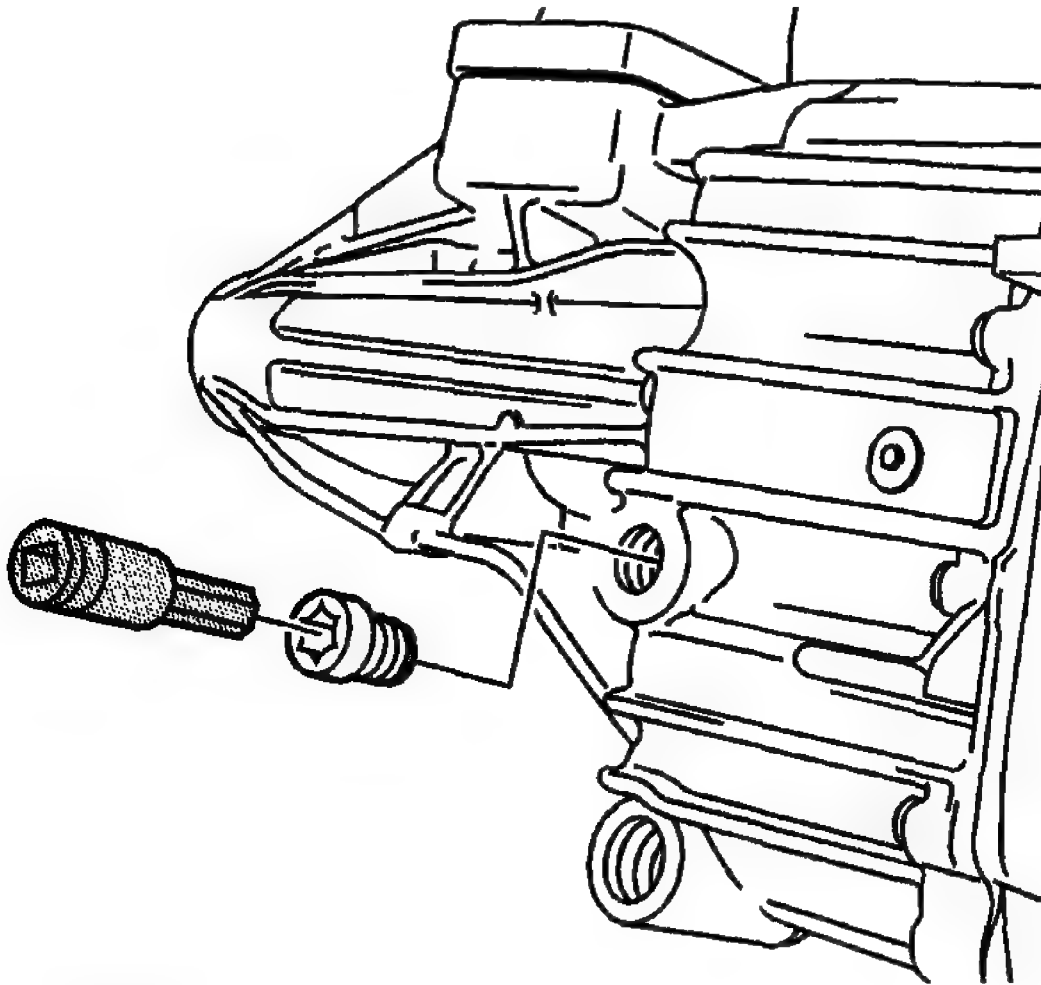
FLUID REPLACEMENT

Tools Required

J 36511 Oil Fill/Drain Plug Hex Bit (17 MM)

Removal Procedure

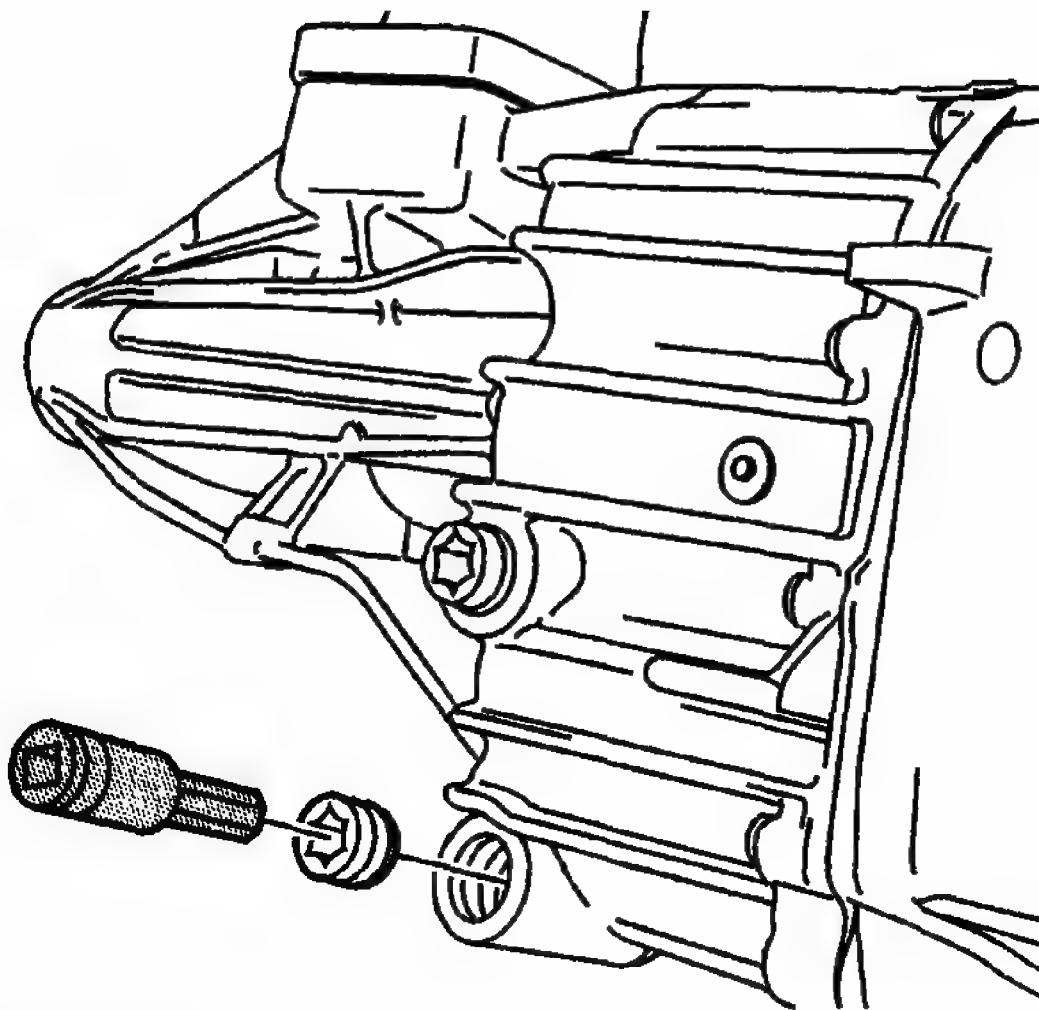
1. Raise and suitably support the vehicle.
2. Using J 36511, remove the oil fill plug.



G01715290

Fig. 31: Transmission Oil Fill Plug

3. Place a suitable drain pan under the transmission in order to catch the drained transmission fluid.
4. Using J 36511 remove the oil drain plug.



G01715291

Fig. 32: Transmission Oil Drain Plug

5. Remove any old sealant from the transmission housing.

Installation Procedure.

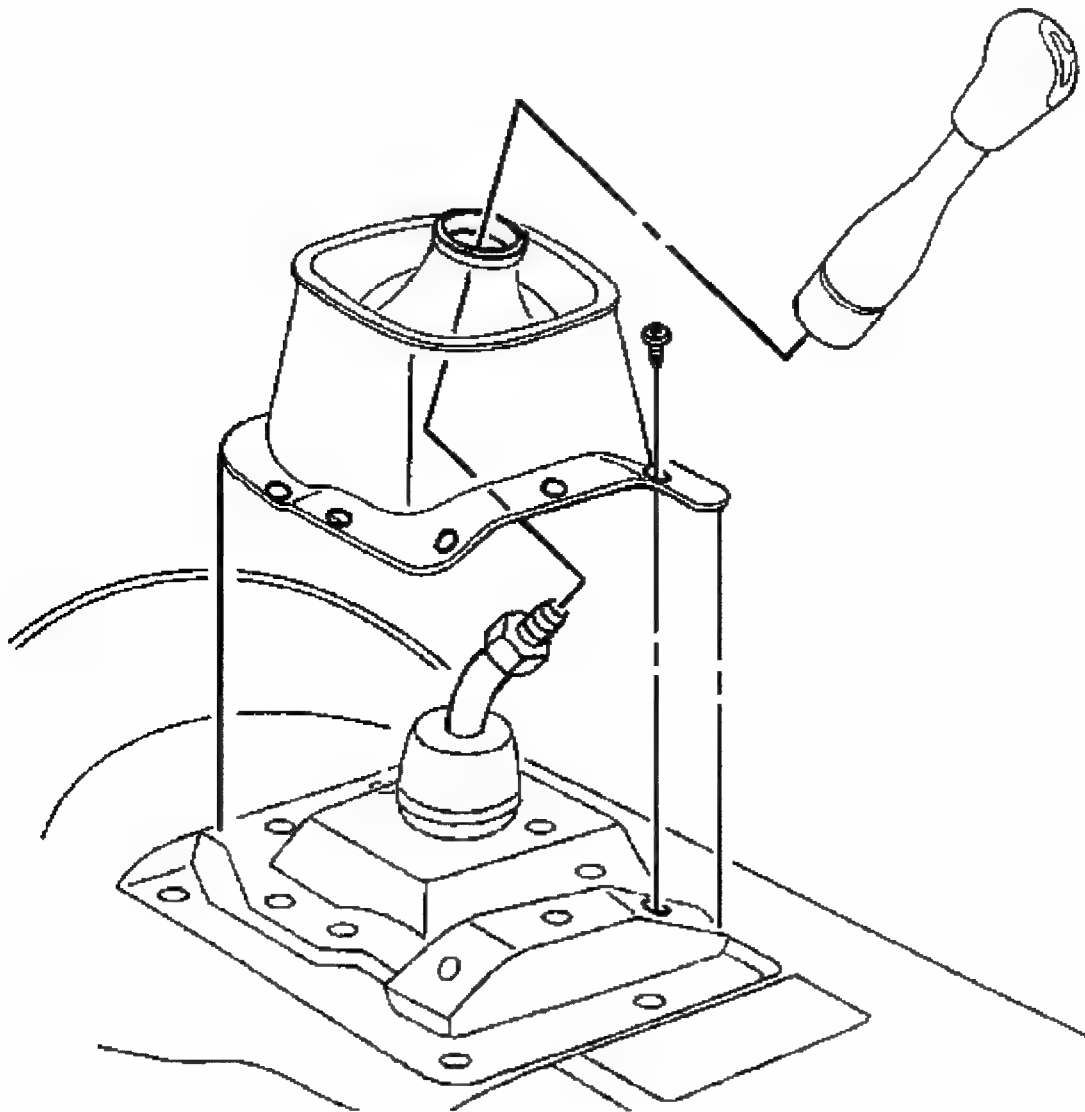
1. Apply sealant GM P/N 12346004 (Canadian P/N 10953480) or equivalent to the **oil drain and fill plug threads** .
2. Using J 36511 install the oil drain plug. Tighten the oil drain plug to 30 N.m (22 lb. ft).
3. Remove and drain the drain pan used to catch the used transmission fluid.
4. Fill the transmission to just below the bottom of the fill plug hole. Refer to **SPECIFICATIONS** .
5. Using J 36511 install the oil fill plug. Tighten the oil fill plug to 30 N.m (22 lb. ft).

6. Lower the vehicle.

SHIFT LEVER ASSEMBLY REPLACEMENT

Removal Procedure

1. Remove the shift lever from the shift tower. Do not remove the shift lever adjusting nut.



G00404641

Fig. 33: Removing/Installing Shift Lever
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws securing the boot to the panel.
3. Remove the boot from the shift tower.

Installation Procedure.

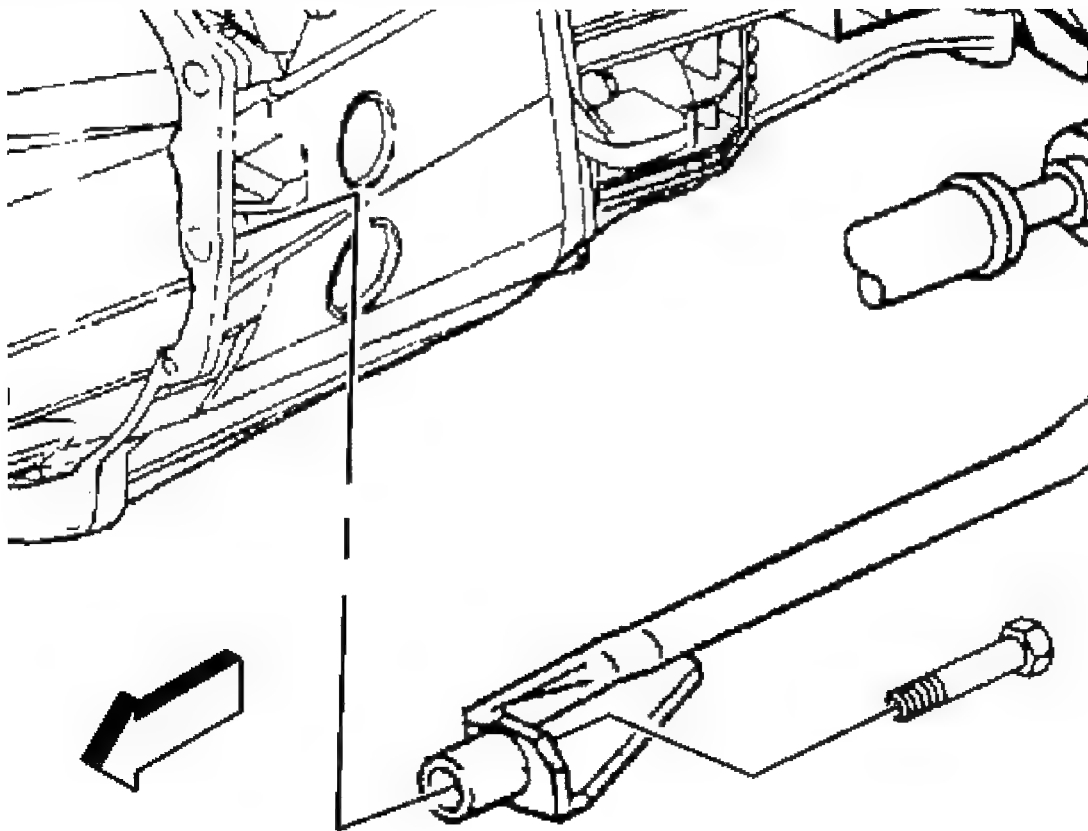
NOTE: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

1. Install the boot over the shift tower and secure to the panel with the screws. See **Fig. 33** . Tighten the screws to 2 N.m (18 lb. in).
2. Install the shift lever to the shift tower. If required, center the shift lever with the adjusting nut. Tighten the adjusting nut to 48 N.m (35 lb. ft).

SHIFT TOWER REPLACEMENT**Removal Procedure**

NOTE: Ensure that the shift lever is positioned into the mechanical third or fourth gear prior to removal of the shift housing from the transmission. The transmission must remain in this state when the shift housing is removed. Do not disassemble the transmission shift housing. Internal parts for this shift housing are not available. Opening the shift housing voids the warranty. When removing the shift housing from the transmission, use the exposed bolts on the base of the housing. If equipped, remove the 3 console nuts and console.

1. Remove the shift lever. Refer to **Shift Lever Assembly Replacement** .
2. Raise and support the vehicle.
3. Place a suitable jack under the transmission.
4. If equipped with a transfer case, remove the front driveshaft.
5. Remove the rear driveshaft.
6. If equipped, remove the transfer case shield.
7. If equipped with a transfer case, remove the bolt securing the left side support brace to the transmission.

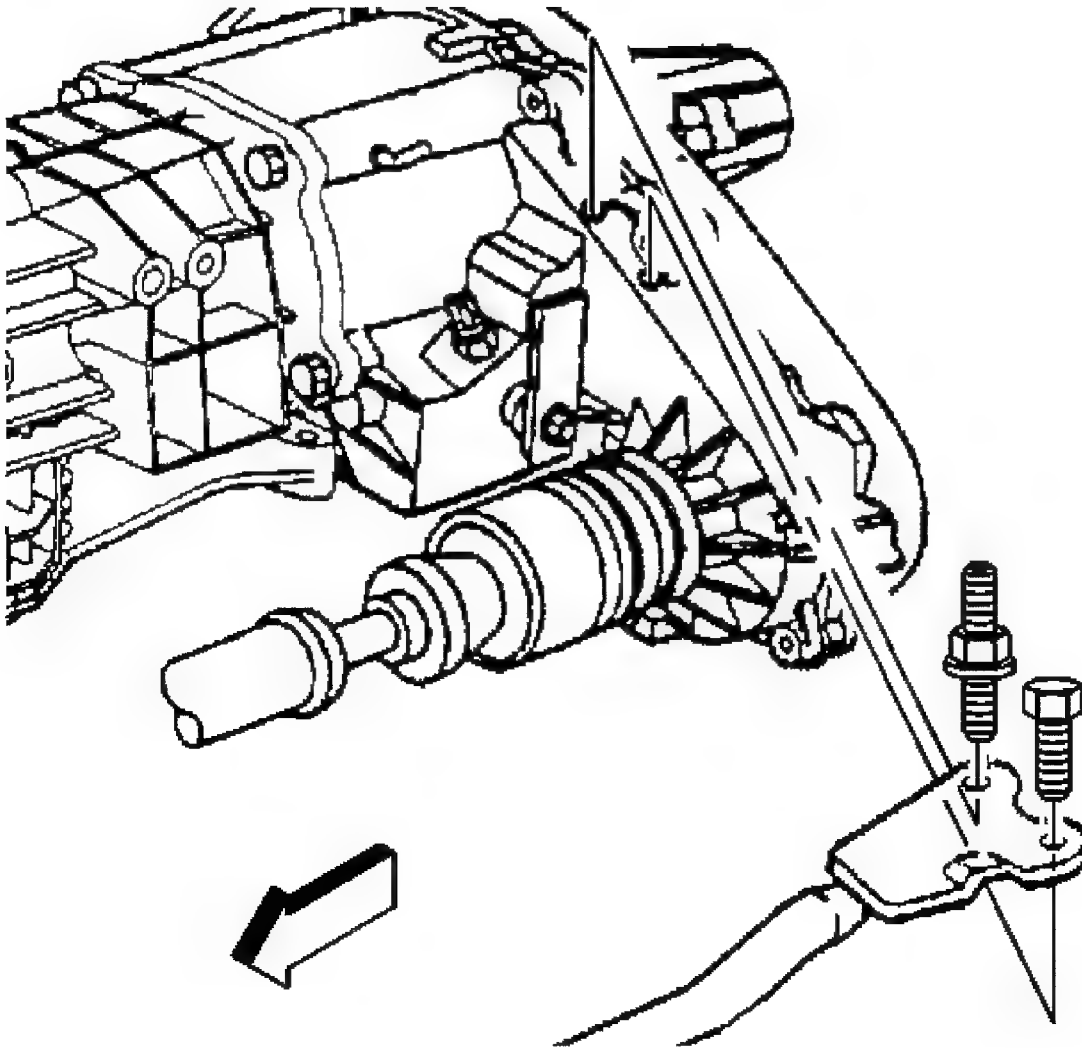


G00404632

Fig. 34: Removing/Installing Left Side Transfer Case-To-Transmission Support Brace Bolt (4WD)

Courtesy of GENERAL MOTORS CORP.

8. If equipped with a transfer case, remove the bolt and stud securing the left side support brace to the transfer case.

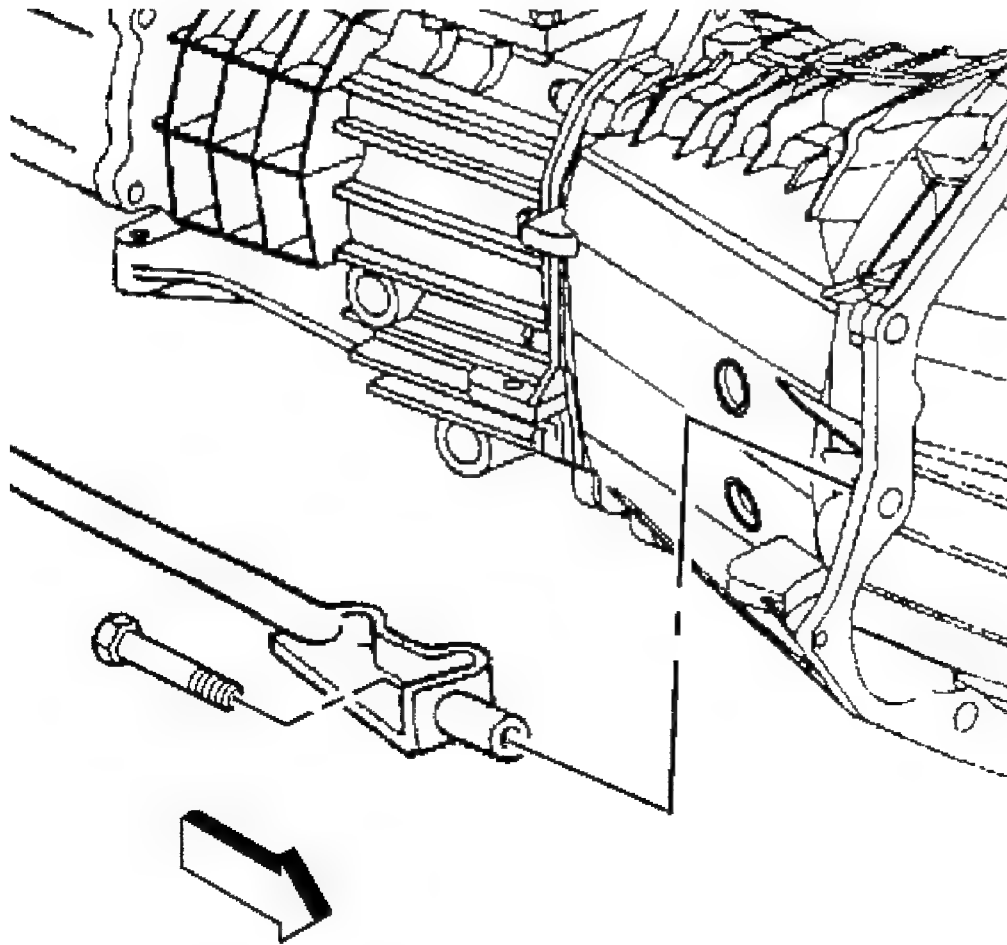


G00404633

Fig. 35: Removing/Installing Left Side Transmission-To-Transfer Case Support Brace Bolt & Stud (4WD)

Courtesy of GENERAL MOTORS CORP.

9. If equipped with a transfer case, remove the bolt securing the right side support brace to the transmission.

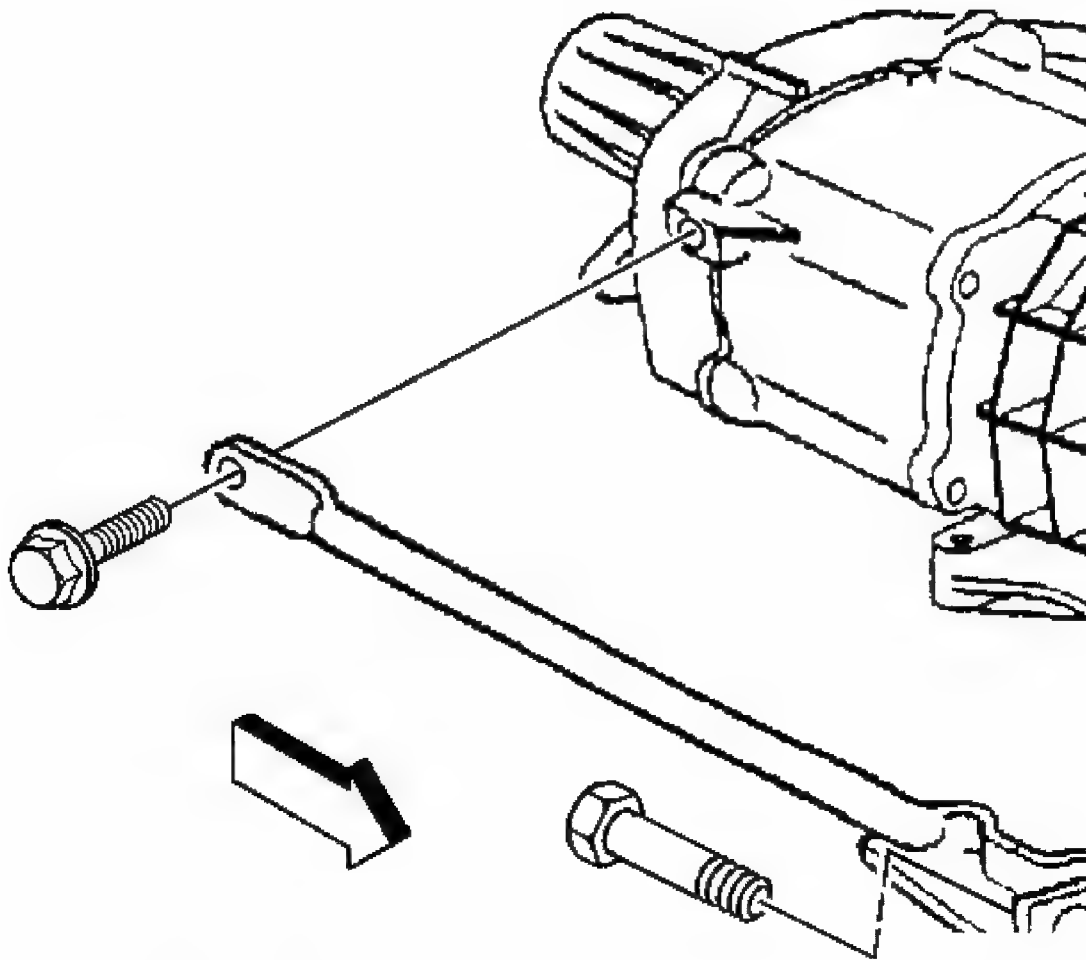


G00404634

Fig. 36: Removing/Installing Right Side Transfer Case-To-Transmission Support Brace Bolt (4WD)

Courtesy of GENERAL MOTORS CORP.

10. If equipped with a transfer case, remove the bolt securing the right side support brace to the transfer case.

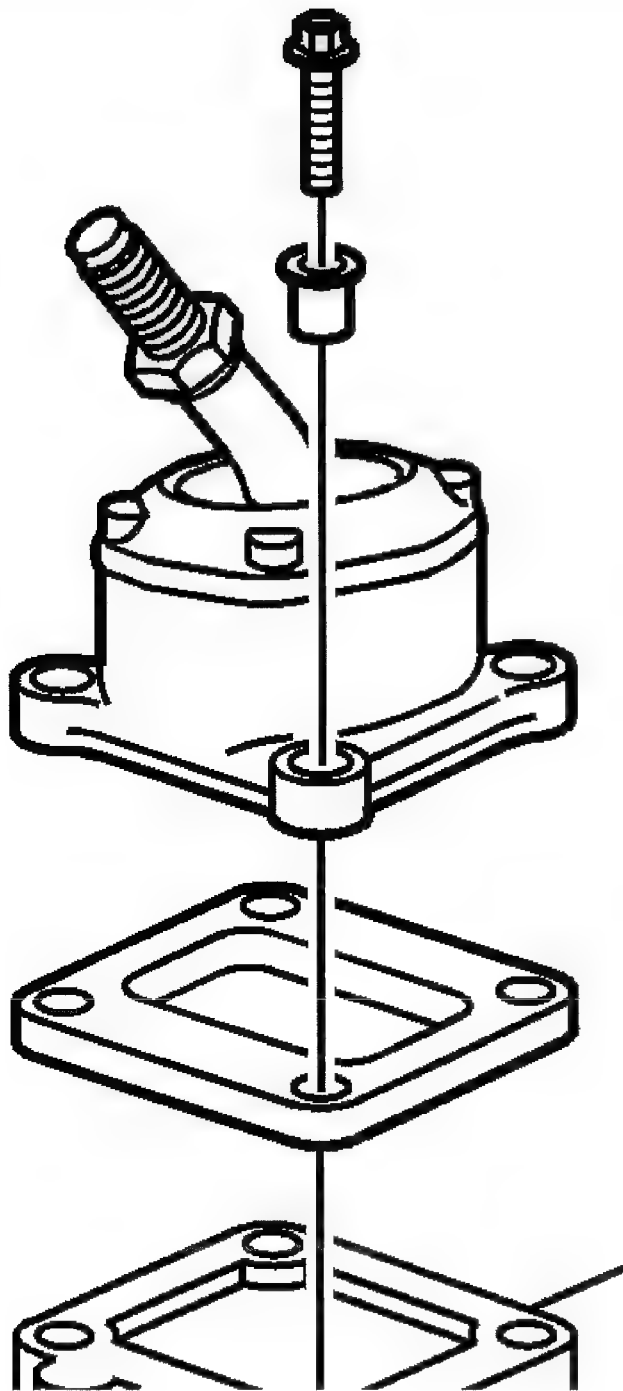


G00404635

Fig. 37: Removing/Installing Right Side Transmission-To-Transfer Case Support Brace Bolt (4WD)

Courtesy of GENERAL MOTORS CORP.

11. Remove the 2 rear transmission mount nuts.
12. Remove the 4 crossmember bolts and nuts.
13. Remove the transfer case, if equipped. Refer to **REMOVAL & INSTALLATION** .
14. Lower the transmission enough to gain access to the top of the transmission.
15. Push the insulator up towards the panel from the transmission case to gain access to the shift tower bolts.
16. Remove the 4 bolts securing the shift housing to the transmission.



G00404823

Fig. 38: Removing/Installing Shift Housing To Transmission
Courtesy of GENERAL MOTORS CORP.

17. Remove the shift housing.

Installation Procedure

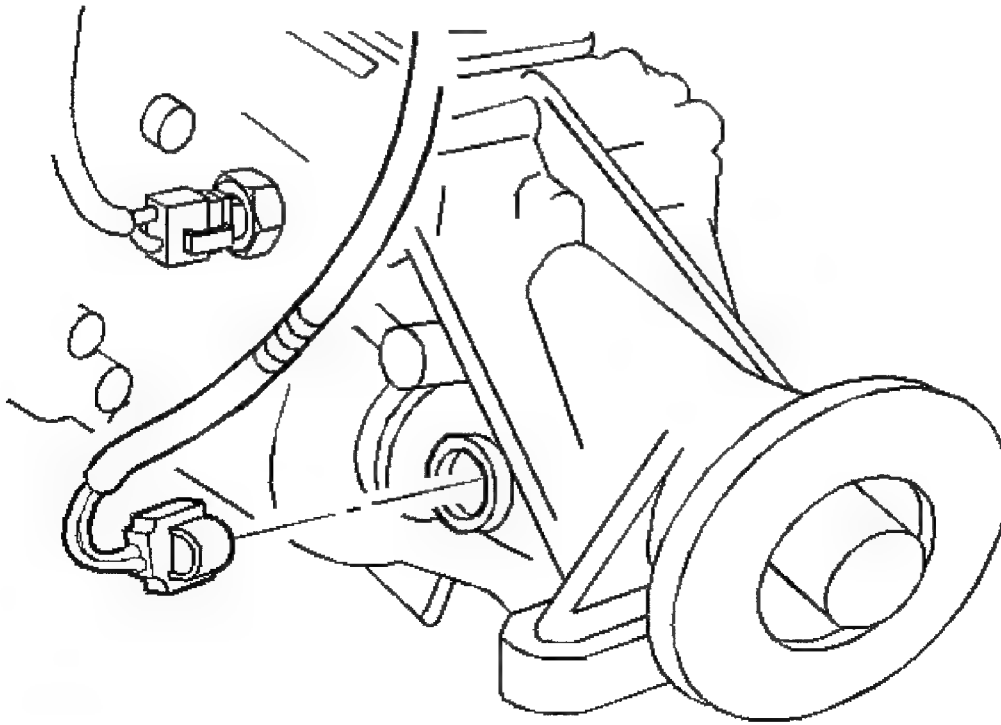
1. Install the shift housing to the transmission case. See **Fig. 38** .

NOTE: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

2. Install the 4 bolts securing the shift housing to the transmission. Tighten the shift housing bolts to 12 N.m (106 lb. in).
3. Place the insulator back on top of the shift tower.
4. Slightly raise the transmission.
5. If equipped, install the transfer case. Refer to **REMOVAL & INSTALLATION** .
6. Install the rear transmission mount bolts. Tighten the bolts to 50 N.m (37 lb. ft).
7. Install the crossmember.
8. Install the 4 crossmember bolts and nuts. Tighten the bolts and nuts to 50 N.m (37 lb. ft).
9. If equipped with a transfer case, install the bolt securing the right side support brace to the transmission. See **Fig. 36** . Install the bolt securing the right side support brace to the transfer case. See **Fig. 37** . Tighten the right side support brace bolts to 50 N.m (37 lb. ft).
10. If equipped with a transfer case, install the bolt and stud securing the left side support brace to the transfer case. See **Fig. 35** . Install the bolt securing the left side support brace to the transmission. See **Fig. 34** . Tighten the left side support brace bolts/stud to 50 N.m (37 lb. ft).
11. Install the front driveshaft, if equipped.
12. Install the rear driveshaft.
13. If equipped, install the transfer case shield.
14. Remove the transmission jack.
15. Lower the vehicle.
16. Install the shift lever. See **Shift Lever Assembly Replacement** .

VEHICLE SPEED SENSOR (VSS)

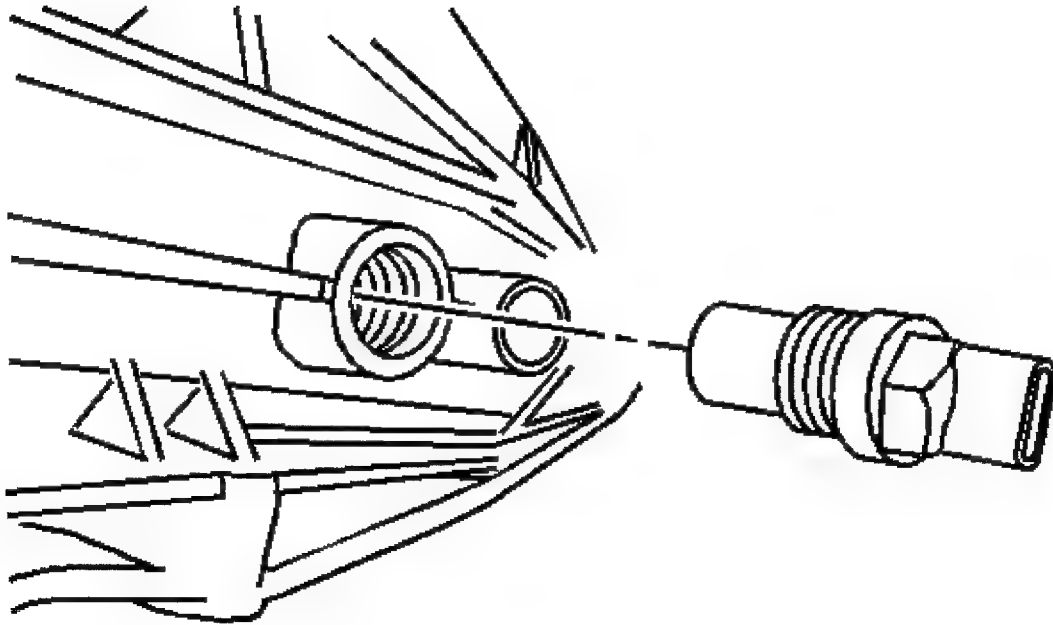
1. Raise and suitably support the vehicle.
2. Disconnect the vehicle speed sensor (VSS) electrical connector (1).



G00404624

Fig. 39: Locating Vehicle Speed Sensor Connector
Courtesy of GENERAL MOTORS CORP.

3. Remove the VSS and O-ring seal.



G00404625

Fig. 40: Removing/Installing Vehicle Speed Sensor
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

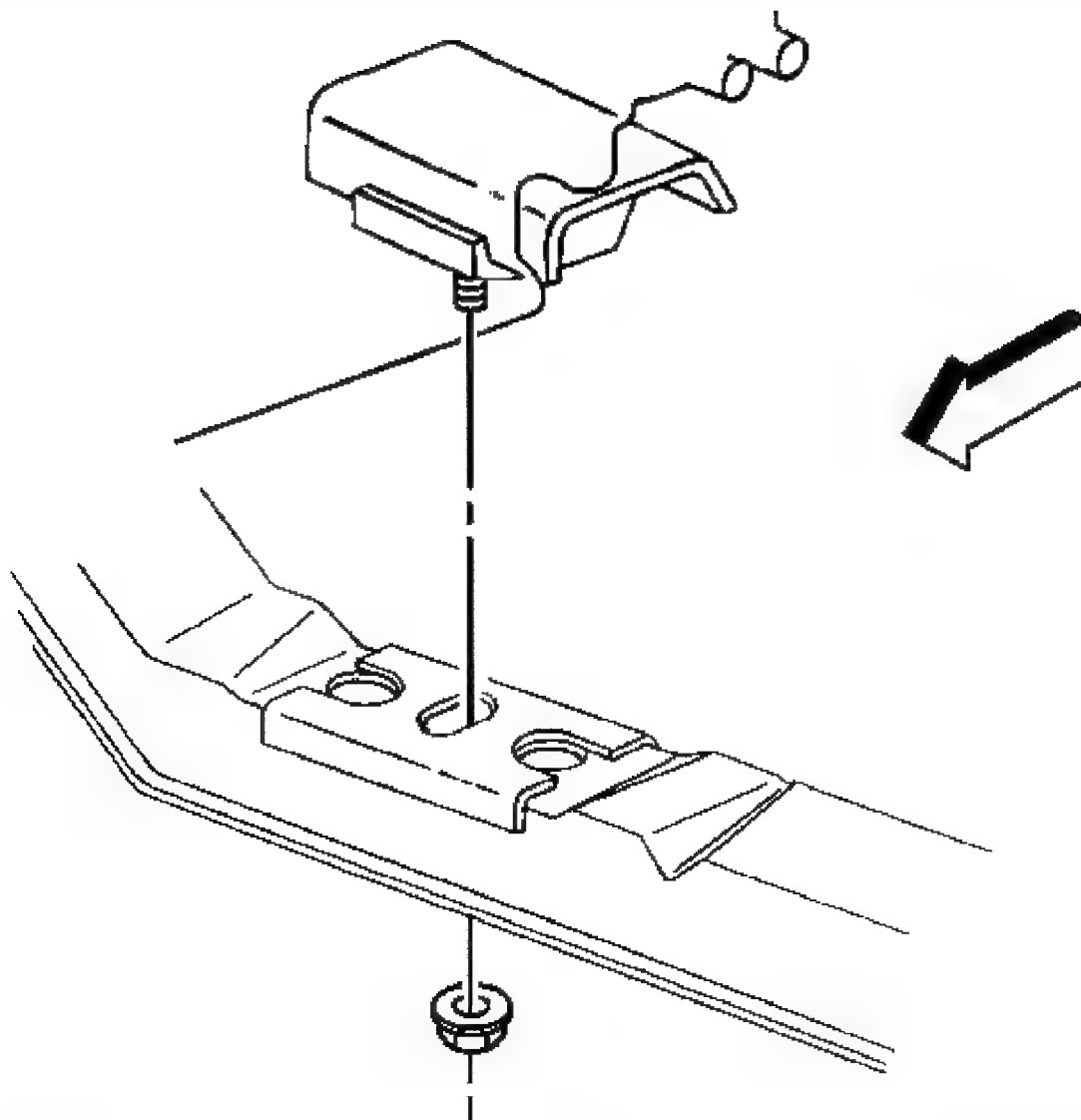
1. Coat a NEW O-ring seal with a thin film of Synchro-mesh transmission fluid GM P/N 12345349 or equivalent.
2. Install the VSS and O-ring seal. Tighten the VSS to 16 N.m (12 lb. ft). See **Fig. 40** .
3. Connect the VSS electrical connector (1). See **Fig. 39** .
4. Lower the vehicle.

TRANSMISSION MOUNT REPLACEMENT

Removal Procedure

NOTE: Broken or deteriorated mounts can cause misalignment and destruction of certain drive train components. When a single mount breaks, the remaining mounts are subjected to abnormally high stresses.

1. Raise and suitably support the vehicle.
2. Remove the nut holding the rear engine mount to the transmission support.



G00404627

Fig. 41: Removing/Installing Rear Engine Mount-To-Transmission Support Nut
Courtesy of GENERAL MOTORS CORP.

3. Remove the mount to transmission bolts.

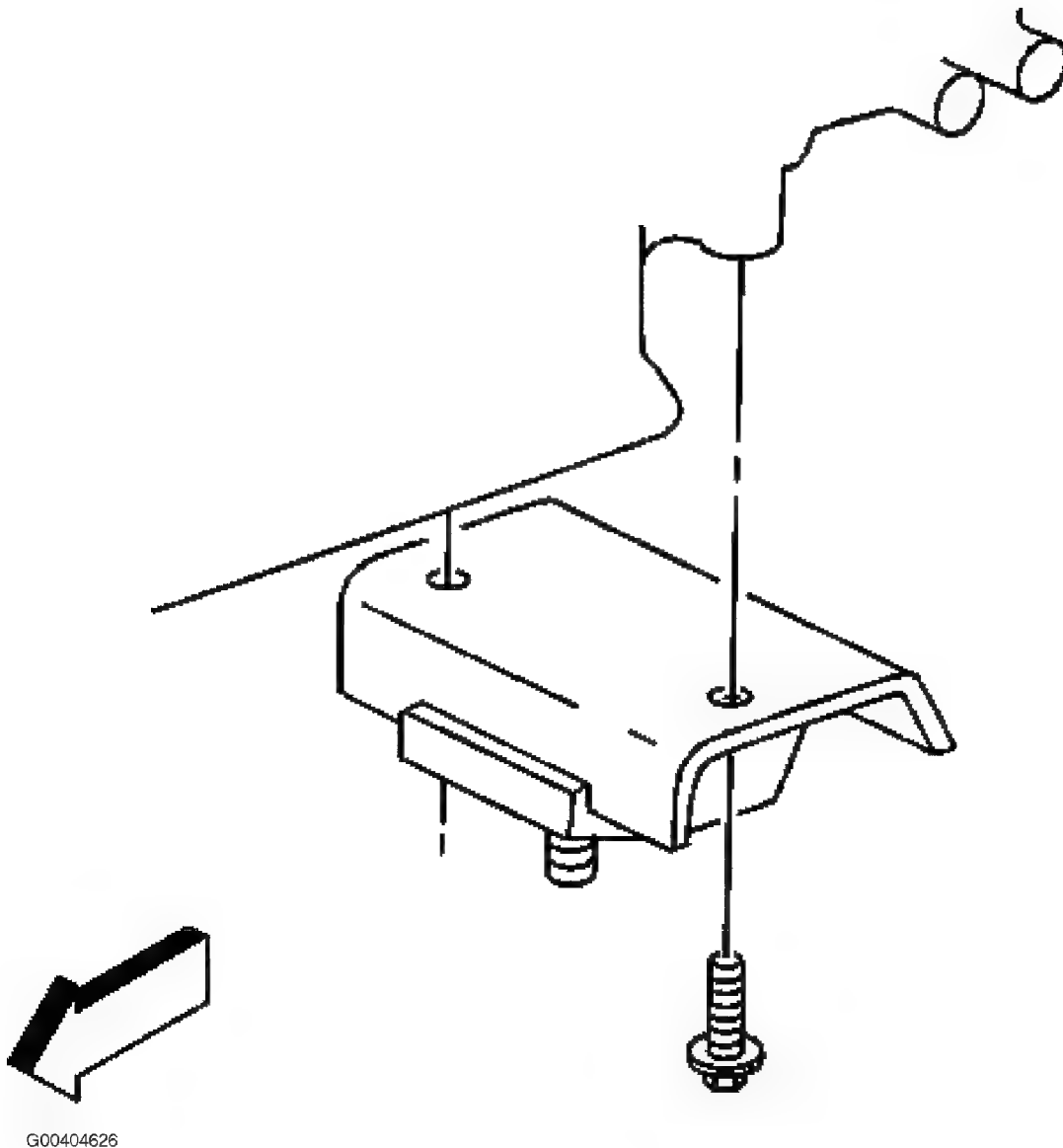


Fig. 42: Removing/Installing Rear Mount-To-Transmission Bolts
Courtesy of GENERAL MOTORS CORP.

4. Raise the transmission using a suitable transmission jack, just enough in order to permit the removal of the mount.
5. Remove the transmission mount.

Installation Procedure

1. Position the transmission mount.
2. Loosely install the mount to transmission bolts. See **Fig. 42** .
3. Lower the transmission.

NOTE: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

4. Install the nut holding the rear engine mount to the transmission support. See **Fig. 41** . Tighten the nut to 45 N.m (33 lb. ft). Tighten the bolt to 50 N.m (37 lb. ft).
5. Lower the vehicle.

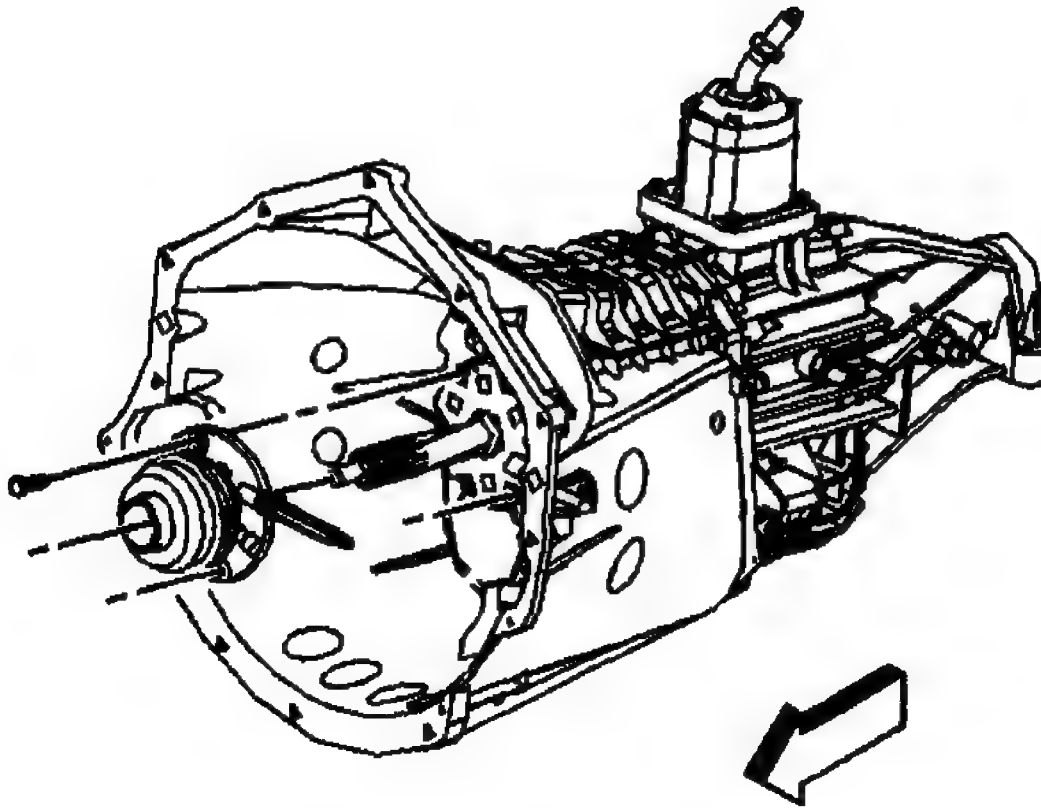
TRANSMISSION HOUSING OIL SEAL REPLACEMENT (FRONT SEAL)

Tools Required

J 38801 Input Shaft Seal Installer

Removal Procedure

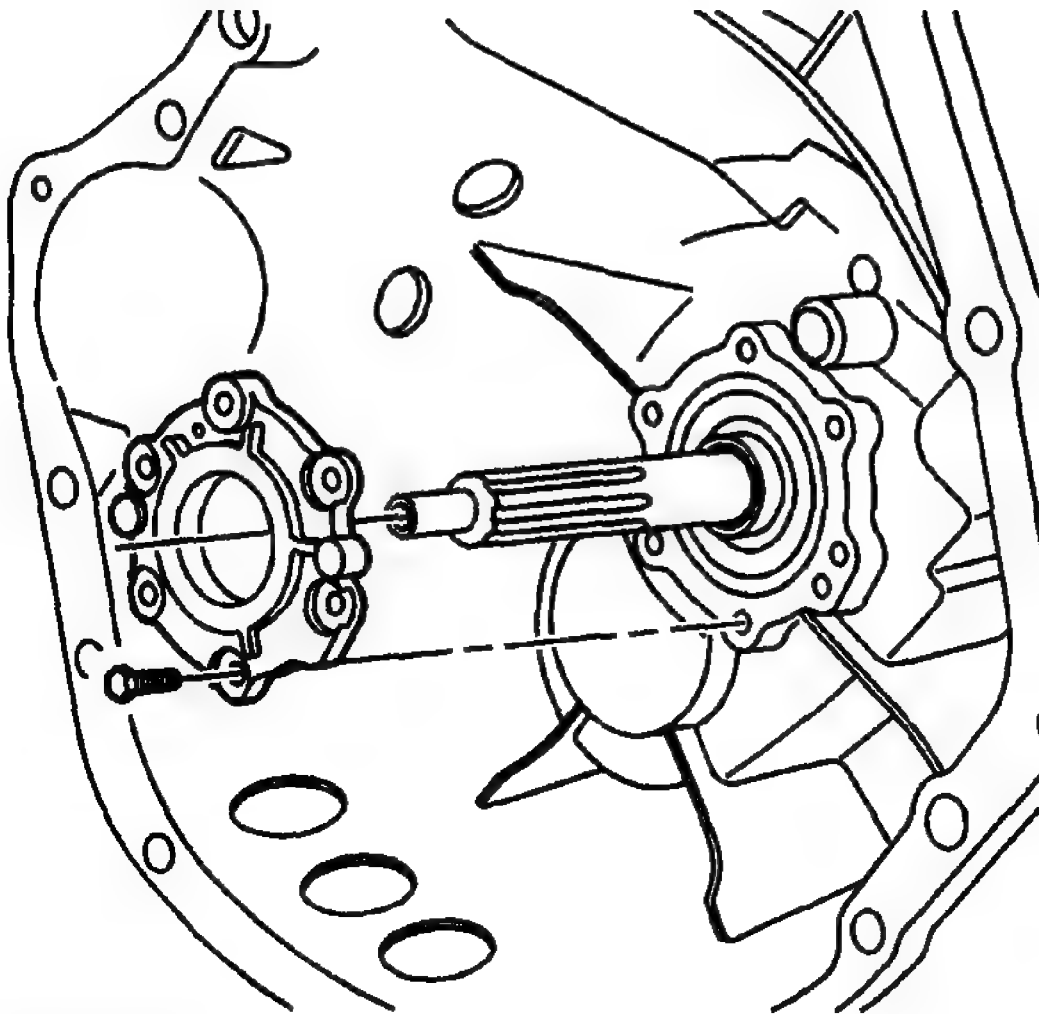
1. Remove the transmission. Refer to **Transmission Replacement** .
2. Remove the clutch actuator cylinder bolts.
3. Remove the clutch actuator cylinder.



G01715312

Fig. 43: Clutch Actuator Cylinder

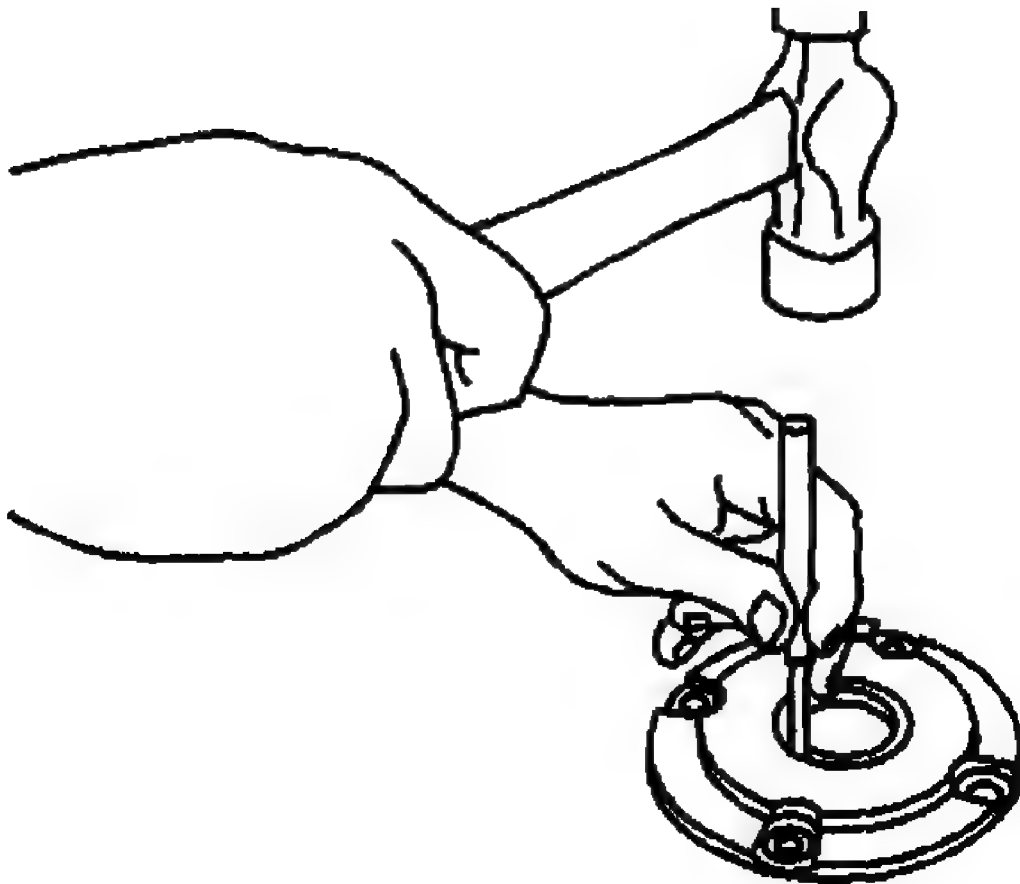
4. Remove the input shaft bearing retainer bolts. Remove the input shaft bearing retainer. Screw 2 of the removed bolts into the threaded holes in the retainer in order to remove the retainer.



G01715313

Fig. 44: Input Shaft Bearing Retainer

5. Using a hammer and a punch, remove the transmission housing front oil seal from the input shaft bearing retainer.



G01715314

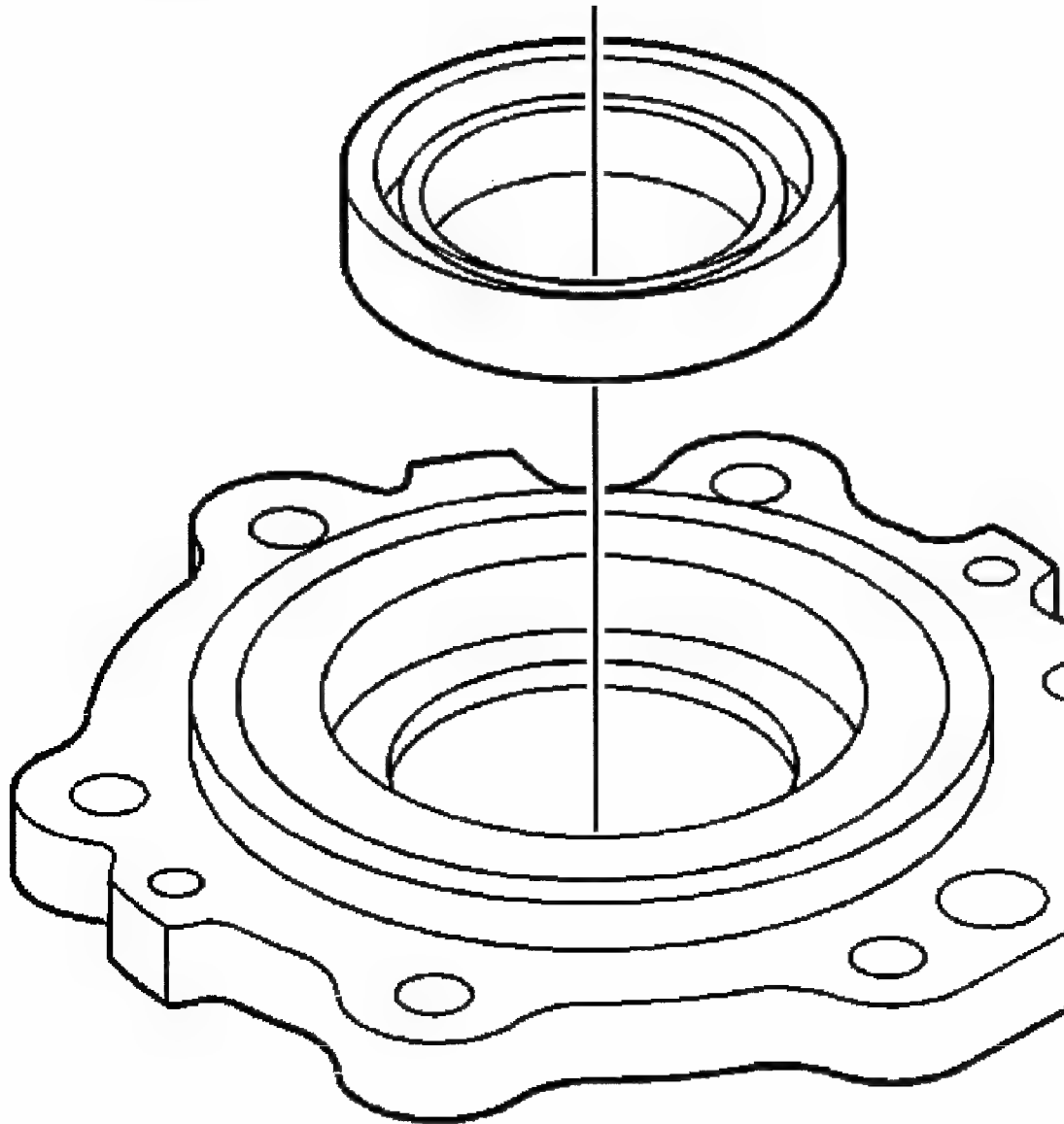
Fig. 45: Transmission Housing Front Oil Seal

6. Remove the old gasket material from the input shaft bearing retainer.

Installation Procedure

Important: Inspect the input shaft bearing retainer for any nicks or cracks that may result in a leak. Replace as necessary.

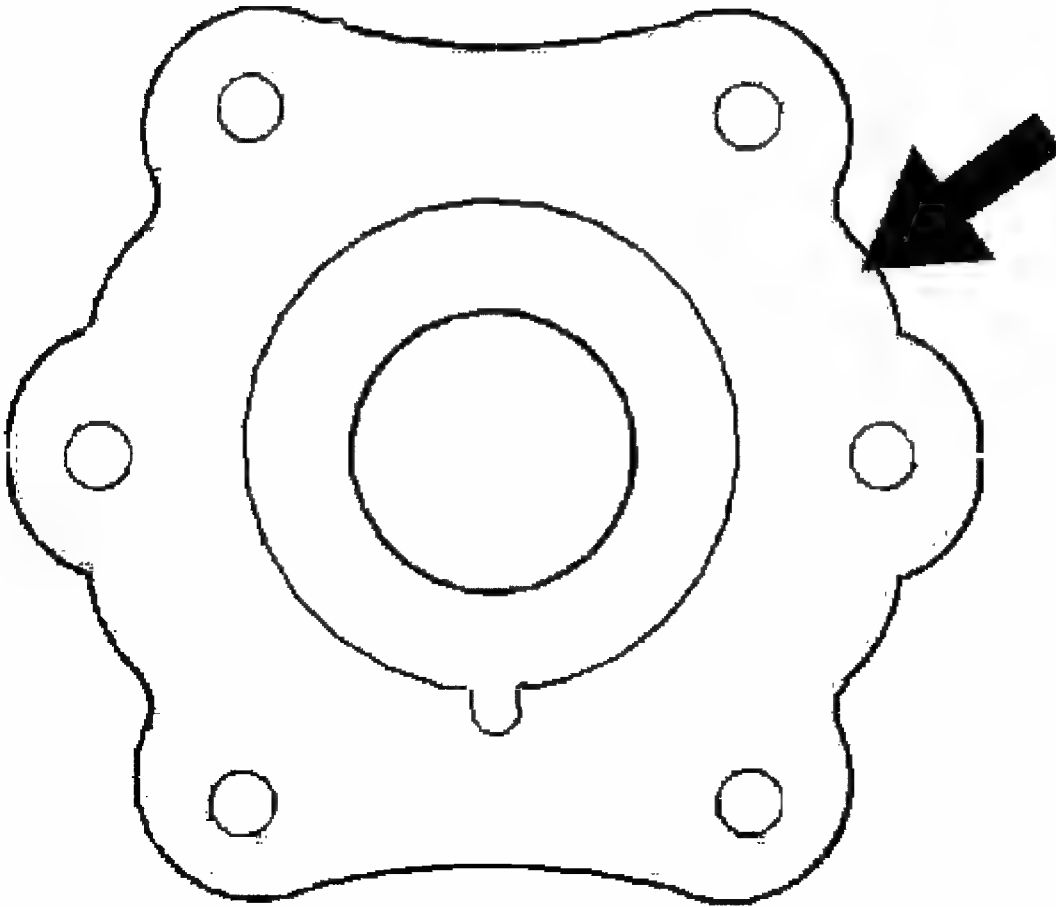
1. Position a NEW oil seal in the input shaft bearing retainer.



G00404629

Fig. 46: Installing Oil Seal In Input Shaft Bearing Retainer

2. Using **J 38801** , install the oil seal.
3. Apply RTV sealer GM P/N 12345739 (Canadian P/N 10953472) or equivalent to the inside edge of the bearing retainer mating surface.



G00404630

Fig. 47: Applying Sealer To Inside Edge Of Bearing Retainer Mating Surface

NOTE: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

4. Install the front bearing retainer and the 6 bolts to the transmission. Tighten the 6 bearing retainer bolts to 14 N.m (10 lb. ft).
5. Install the clutch actuator and the bolts. Tighten the clutch actuator bolts to 8 N.m (71

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

lb. in).

6. Install the transmission. Refer to **Transmission Replacement** .

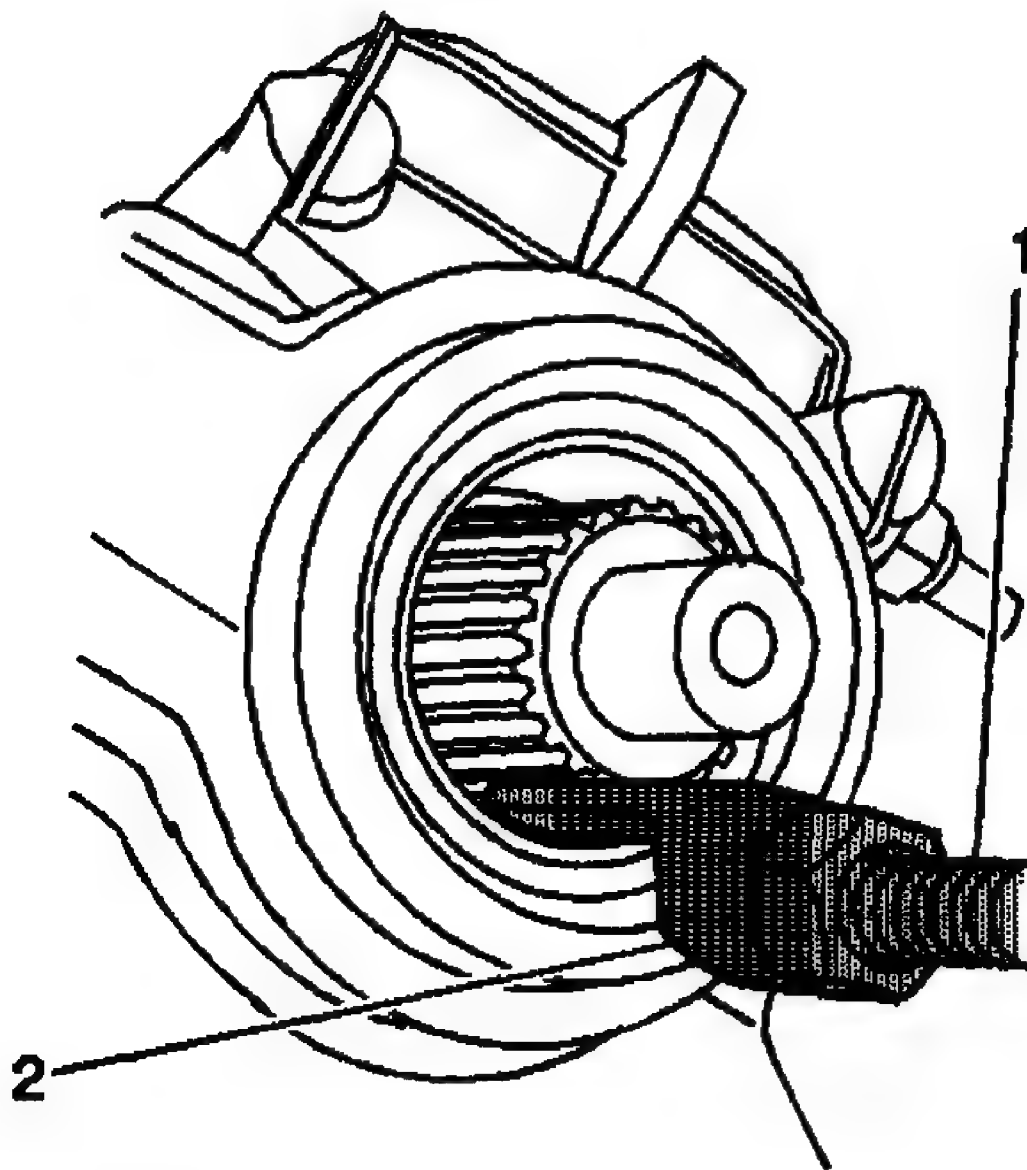
TRANSMISSION HOUSING REAR OIL SEAL REPLACEMENT (2WD)

Tools Required

- **J 23129** Universal Seal Remover
- **J 6125-1B** Slide Hammer
- **J 36503** Extension Housing Seal Installer

Removal Procedure

1. Raise and suitably support vehicle.
2. Remove the rear driveshaft.
3. Remove the rear oil seal using **J 6125-1B** (1) and **J 23129** (2).



G01715319

Fig. 48: Removing Rear Oil Seal

Installation Procedure

1. Using **J 36503** , install the NEW rear oil seal.
2. Install the rear driveshaft.
3. Check the transmission fluid level. Add if necessary.
4. Lower the vehicle.

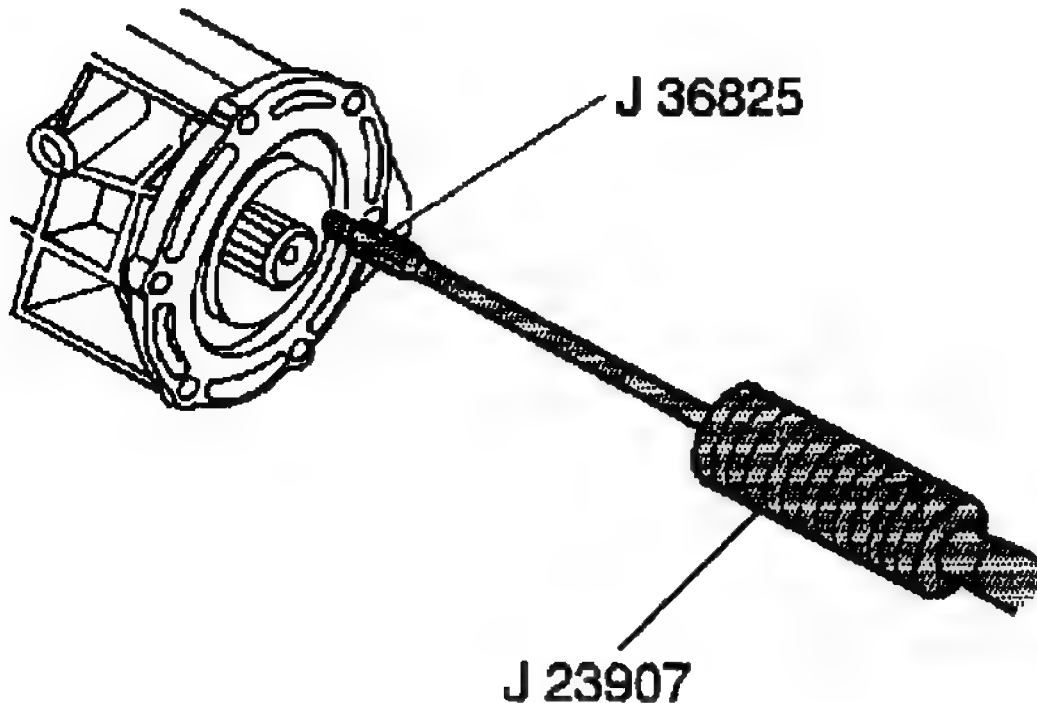
TRANSMISSION HOUSING REAR OIL SEAL REPLACEMENT (4WD)

Tools Required

- **J 36825** Output Shaft Oil Seal Remover
- **J 23907** Slide Hammer
- **J 36502-2A** Output Shaft Oil Seal Protector
- **J 36502** Extension Housing Seal Installer

Removal Procedure

1. Remove transfer case. Refer to **REMOVAL & INSTALLATION**.
2. Using **J 36825** and **J 23907**, remove the output shaft seal.



G01715321

Fig. 49: Removing Output Shaft Seal

Installation Procedure

1. Position the **J 36502-2A** over the output shaft.

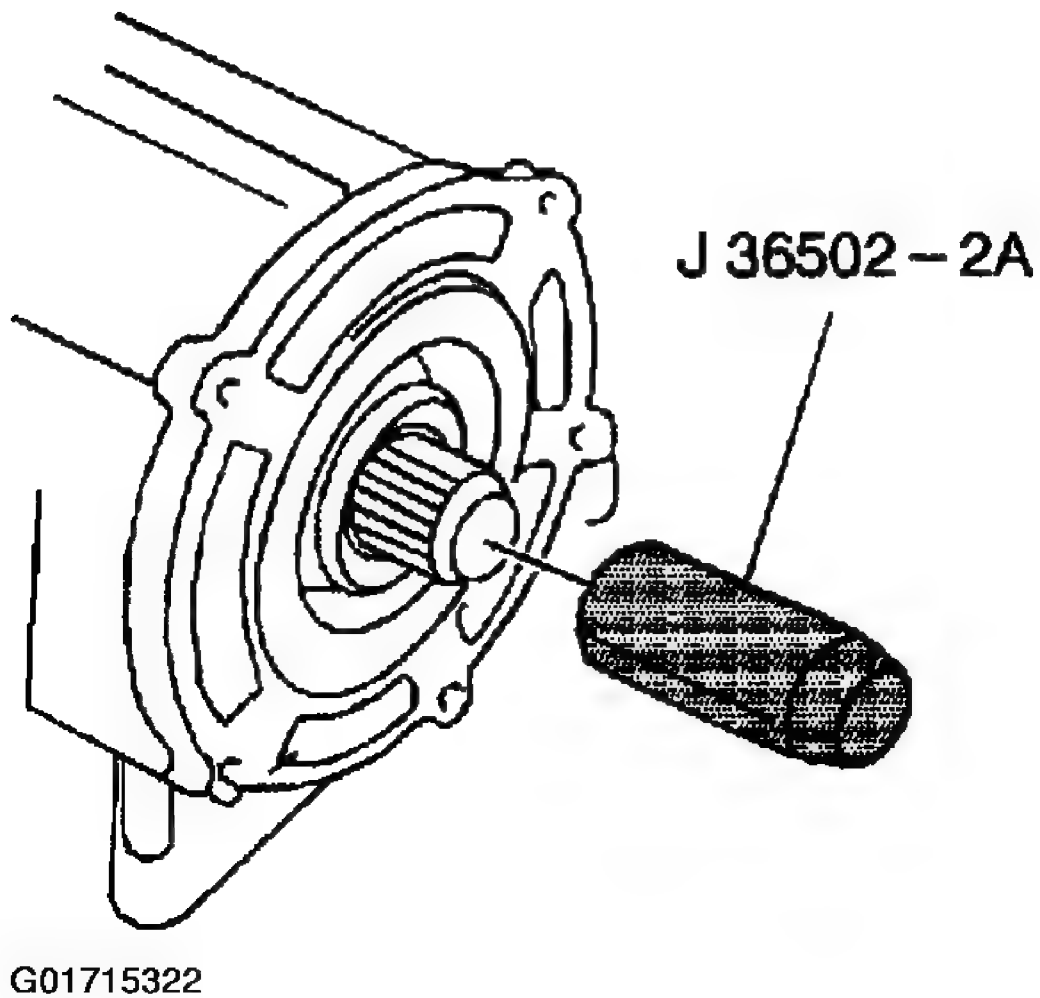


Fig. 50: Positioning J 36502-2A Over Output Shaft

2. Using **J 36502** , install the NEW output shaft seal.

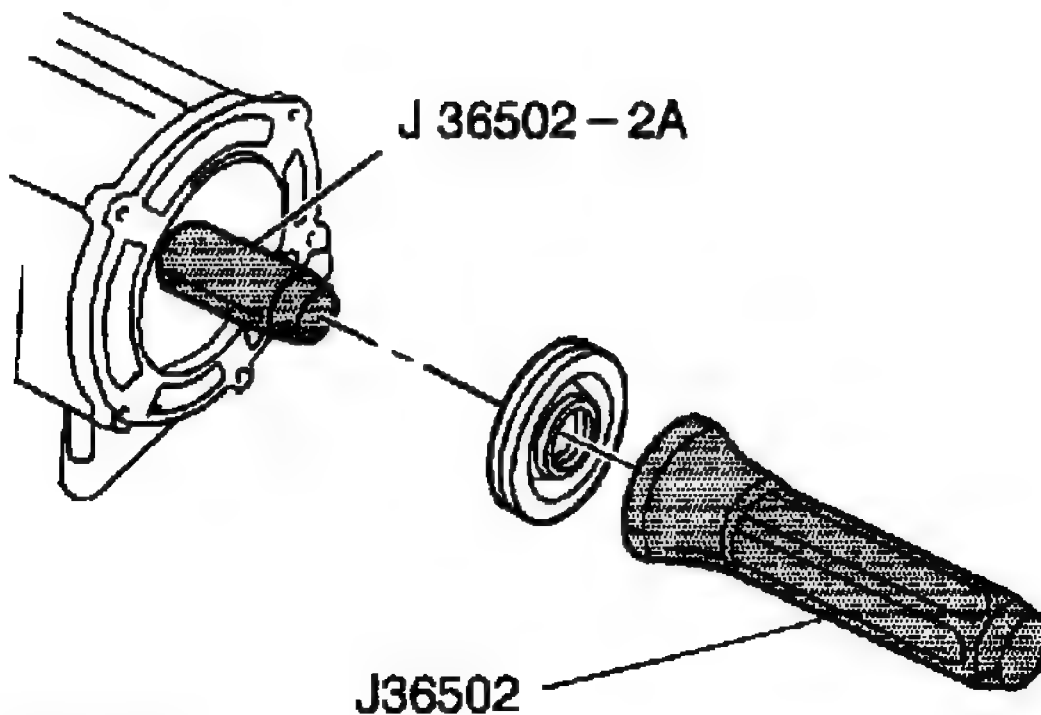
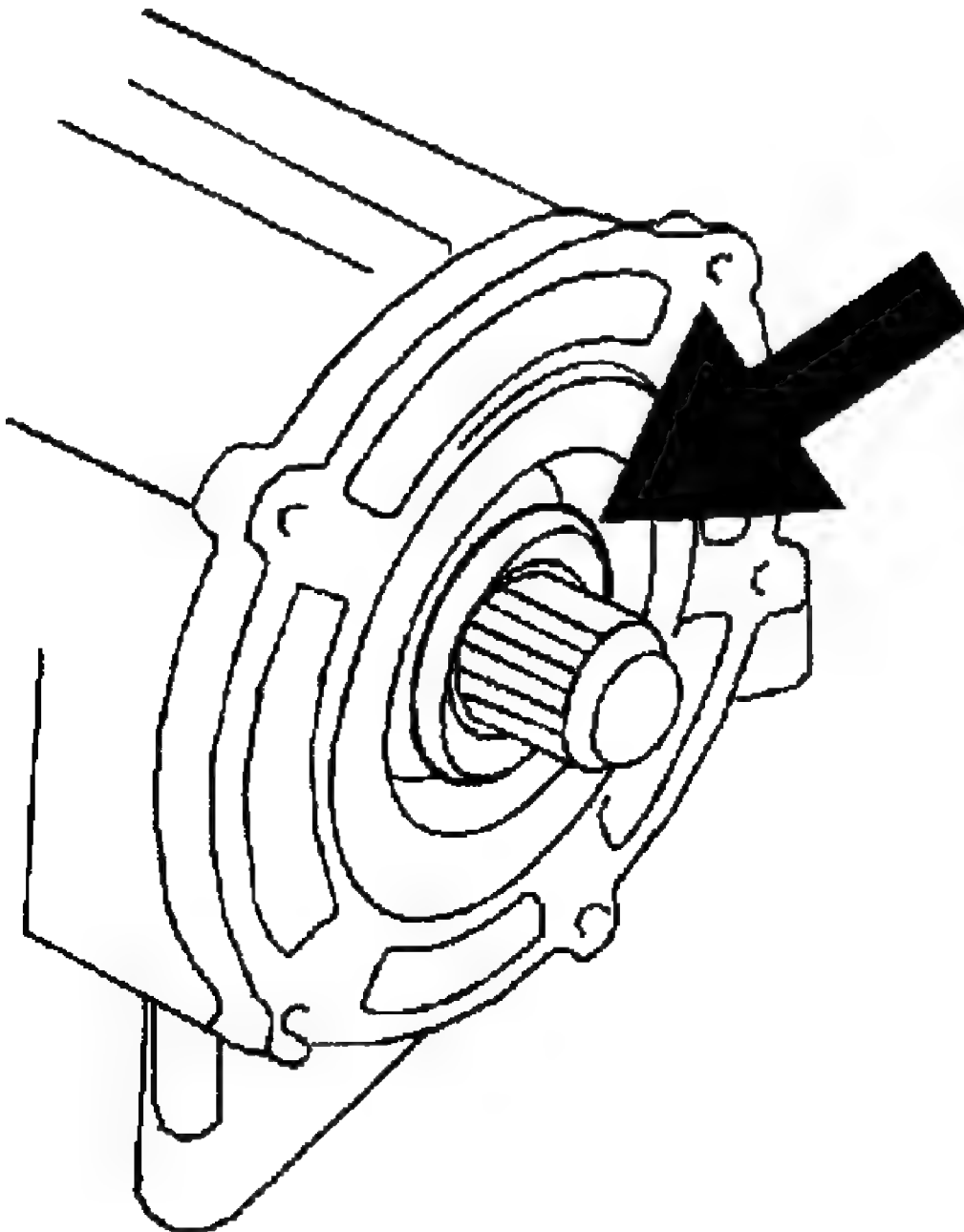


Fig. 51: Installing Output Shaft Seal

3. Remove the **J 36502-2A** from the output shaft.
4. Fill the space between the seal lips with grease GM P/N 1052497 or equivalent.



G01715325

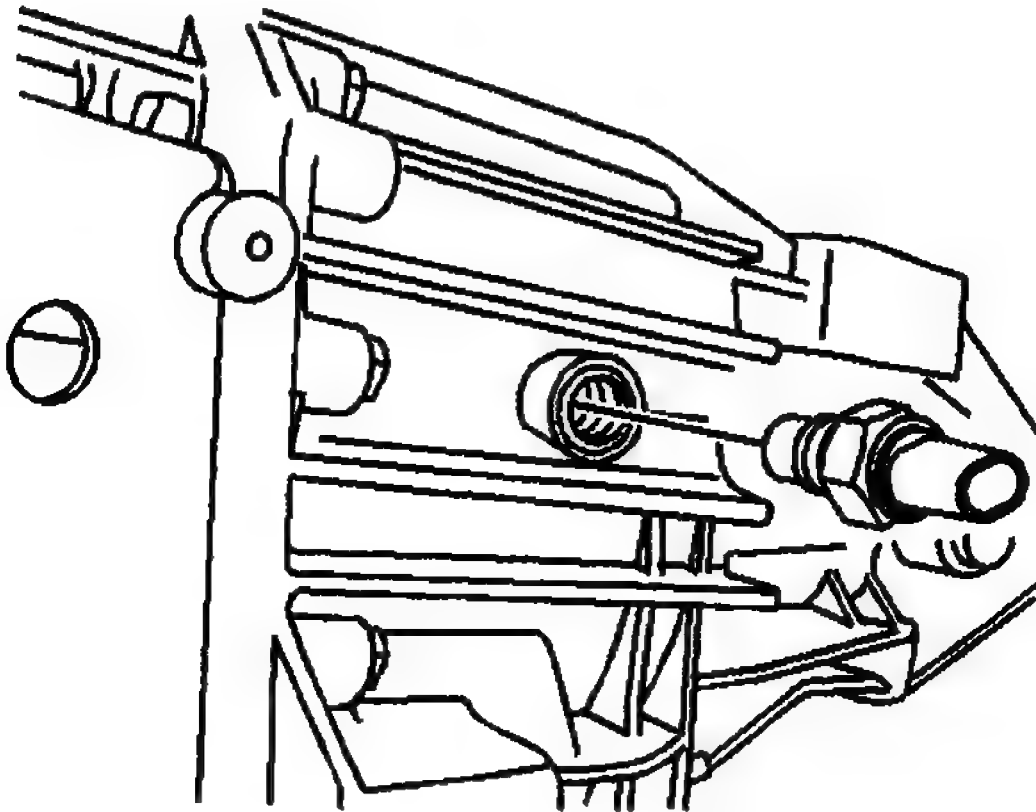
Fig. 52: Filling Space Between Seal Lips With Grease

5. Install transfer case. Refer to **REMOVAL & INSTALLATION**.
6. Check the transmission fluid level. Add as necessary.
7. Lower the vehicle.

BACKUP LAMP SWITCH REPLACEMENT

Removal Procedure

1. Raise and suitably support the vehicle.
2. Disconnect the backup lamp switch electrical connector (3).
3. Remove the backup lamp switch.



G01715327

Fig. 53: Removing/Installing Backup Lamp Switch

Installation Procedure

Important: The backup lamp switch has pre-applied thread sealant on the threads.

1. Install the backup lamp switch. Tighten the backup lamp switch to 37 N.m (27 lb. ft). See **Fig. 53** .
2. Connect the backup lamp switch electrical connector (3).
3. Lower the vehicle.

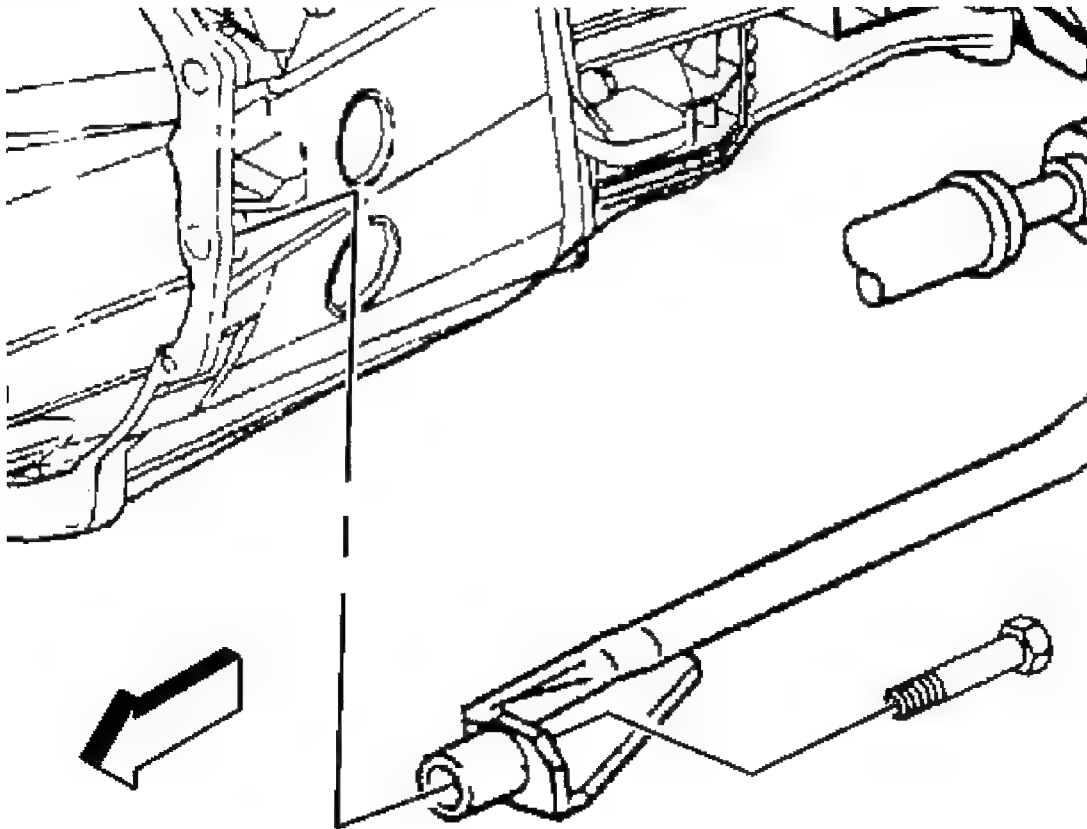
TRANSMISSION REPLACEMENT

Tools Required

J 42371 Hydraulic Clutch Line Separator

Removal Procedure

1. Shift the transmission into 3rd or 4th gear.
2. Remove the shift lever assembly. Refer to **Shift Lever Assembly Replacement** .
3. Remove shift housing. See **Shift Tower Replacement** .
4. Raise and suitably support vehicle.
5. Remove the rear driveshaft.
6. If vehicle is a 4 wheel drive (4WD), remove the front driveshaft.
7. Disconnect the following engine wiring harness electrical connectors:
 - Vehicle speed sensor (VSS) (1)
 - Backup lamp switch (3)
8. Disconnect the wiring harness retainers from the right side of the transmission.
9. Remove the catalytic converter.
10. Remove 3 bolts, 2 nuts and washers securing the transfer case shield to the frame rail and transmission (If the vehicle is equipped with 4WD).
11. If equipped with a transfer case, remove the bolt securing the left side support brace to the transmission.

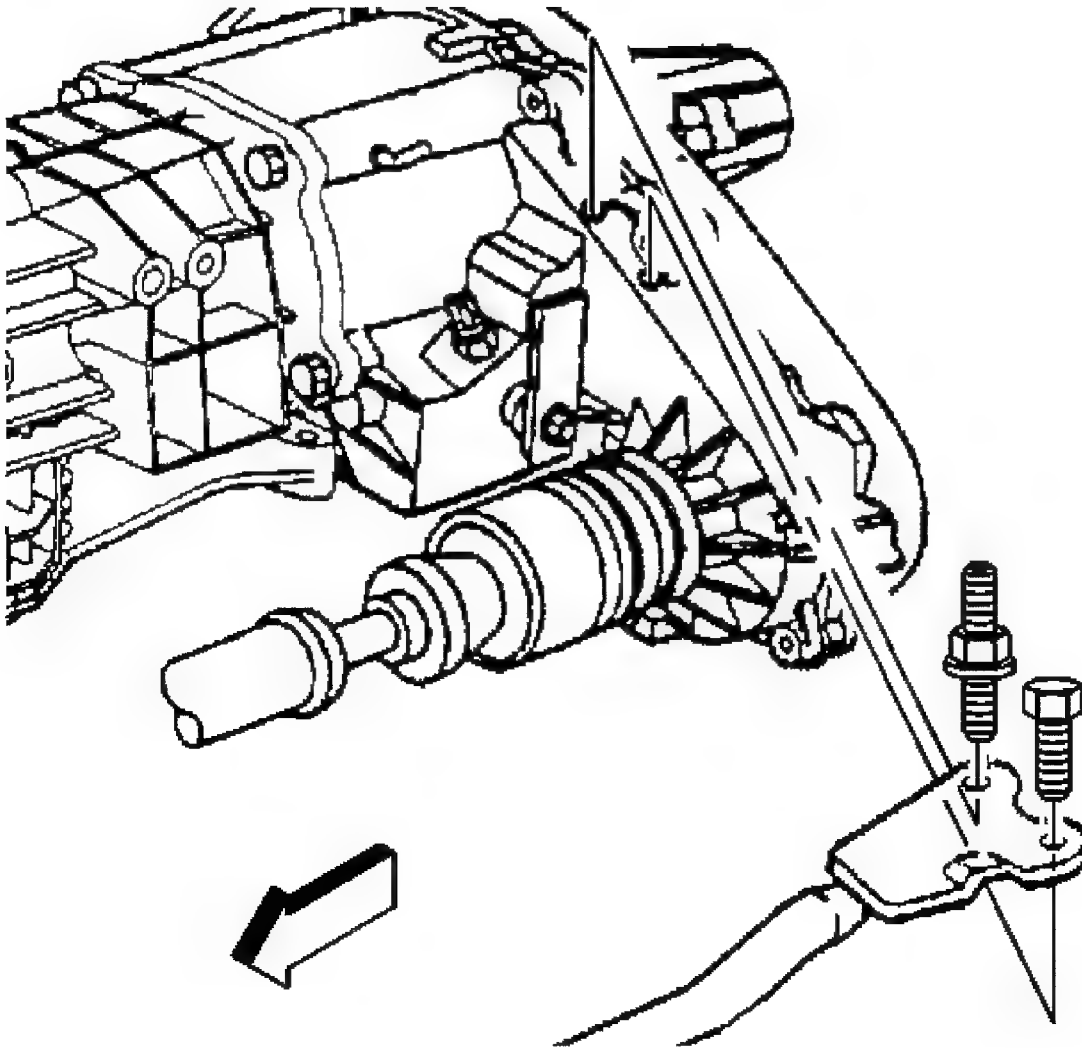


G00404632

Fig. 54: Removing/Installing Left Side Transfer Case-To-Transmission Support Brace Bolt (4WD)

Courtesy of GENERAL MOTORS CORP.

12. If equipped with a transfer case, remove the bolt and stud securing the left side support brace to the transfer case.

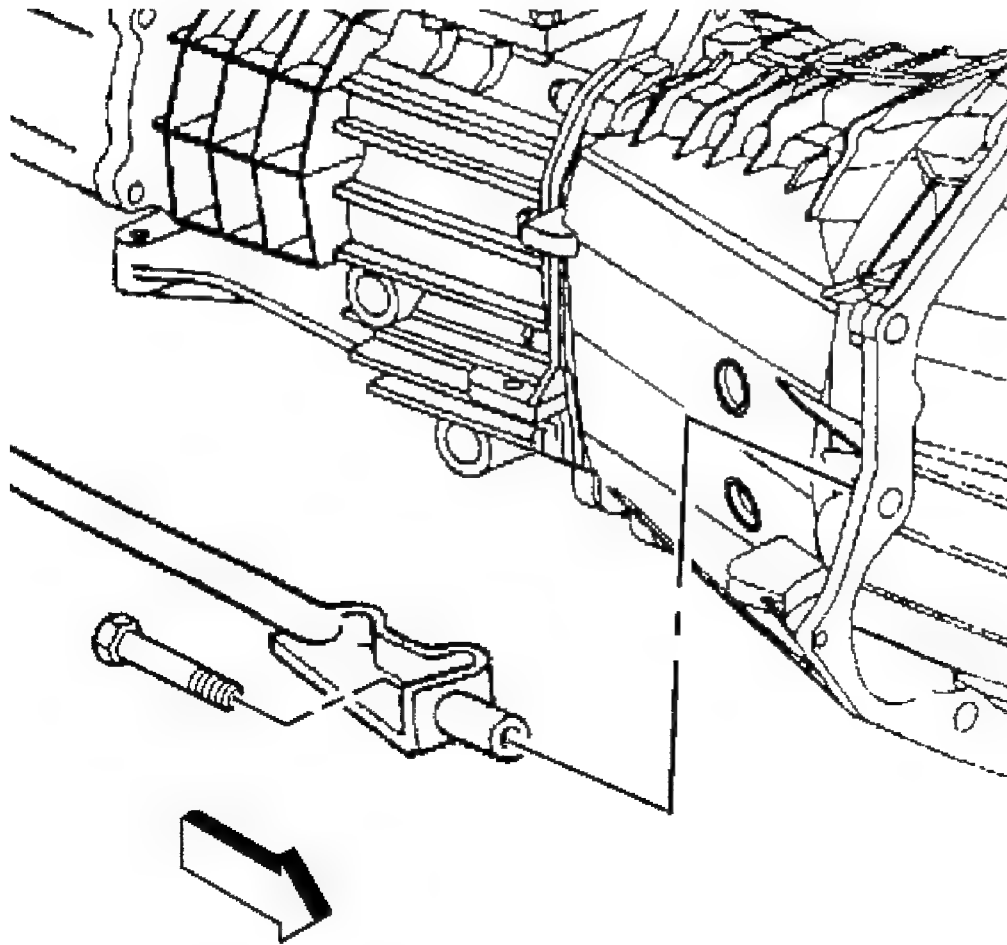


G00404633

Fig. 55: Removing/Installing Left Side Transmission-To-Transfer Case Support Brace Bolt & Stud (4WD)

Courtesy of GENERAL MOTORS CORP.

13. If equipped with a transfer case, remove the bolt securing the right side support brace to the transmission.



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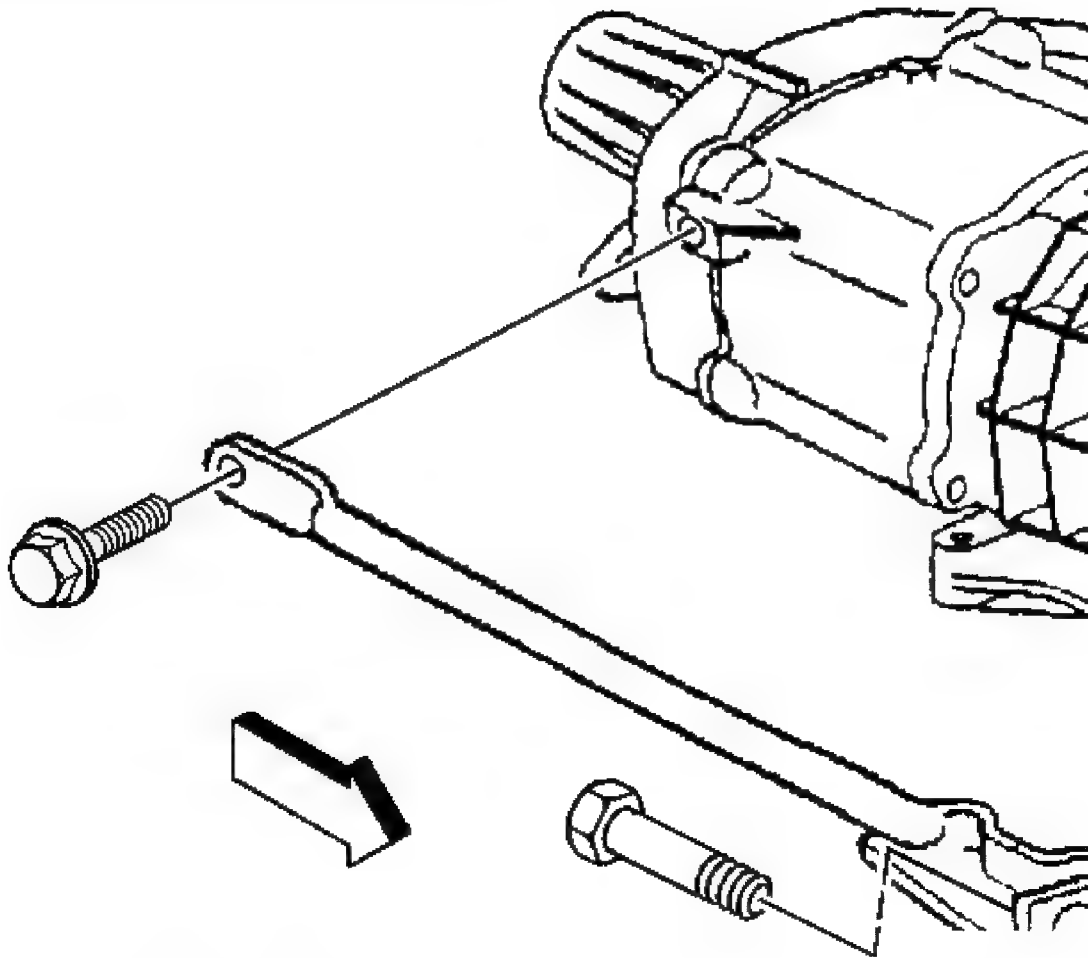
Fig. 56: Removing/Installing Right Side Transfer Case-To-Transmission Support Brace Bolt (4WD)

Courtesy of GENERAL MOTORS CORP.

14. If equipped with a transfer case, remove the bolt securing the right side support brace to the transfer case.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

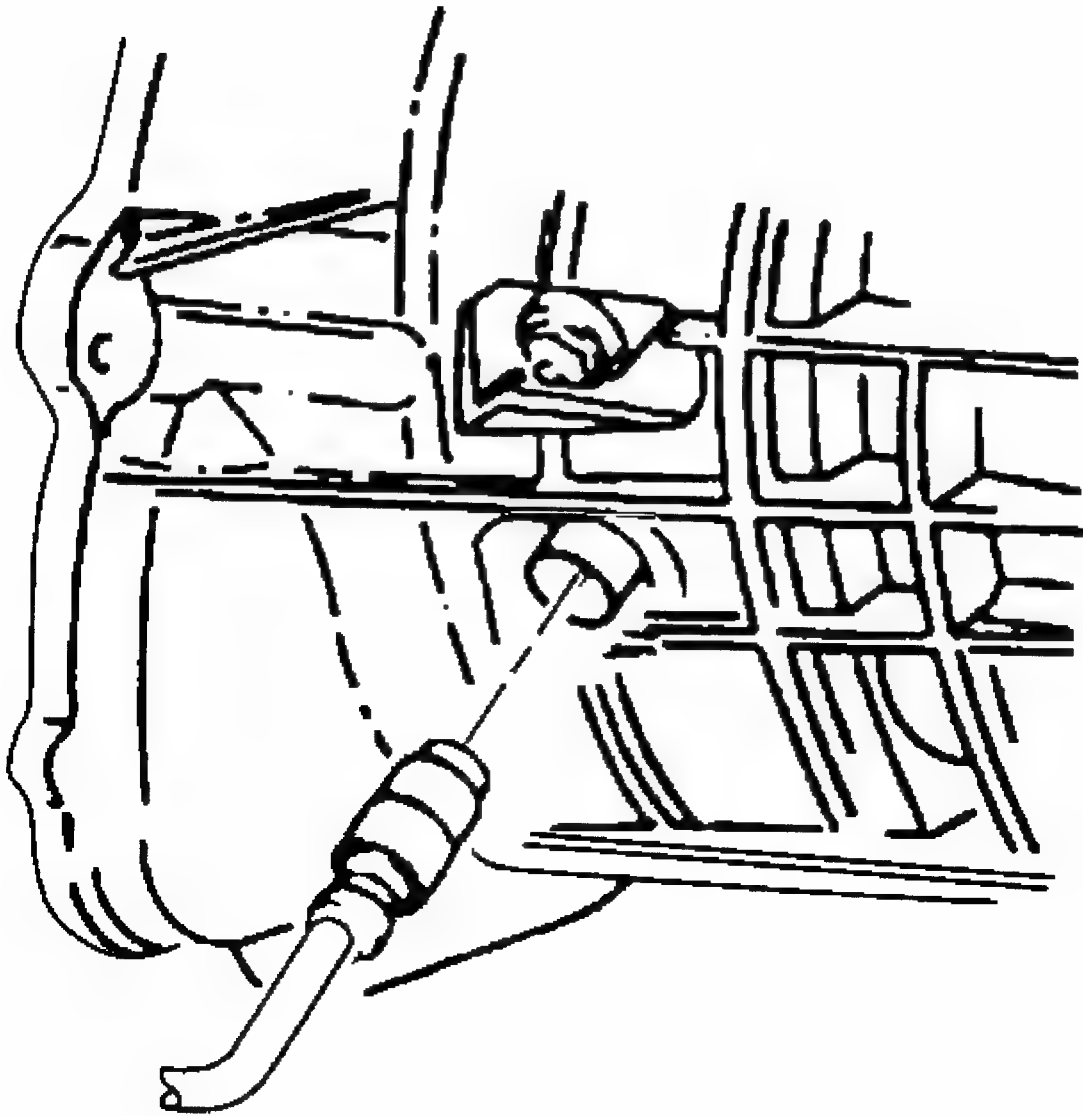


G00404635

Fig. 57: Removing/Installing Right Side Transmission-To-Transfer Case Support Brace Bolt (4WD)

Courtesy of GENERAL MOTORS CORP.

15. Remove the transfer case, if equipped. Refer to **REMOVAL & INSTALLATION** .
16. Disconnect the hydraulic clutch line quick connect from the clutch actuator.

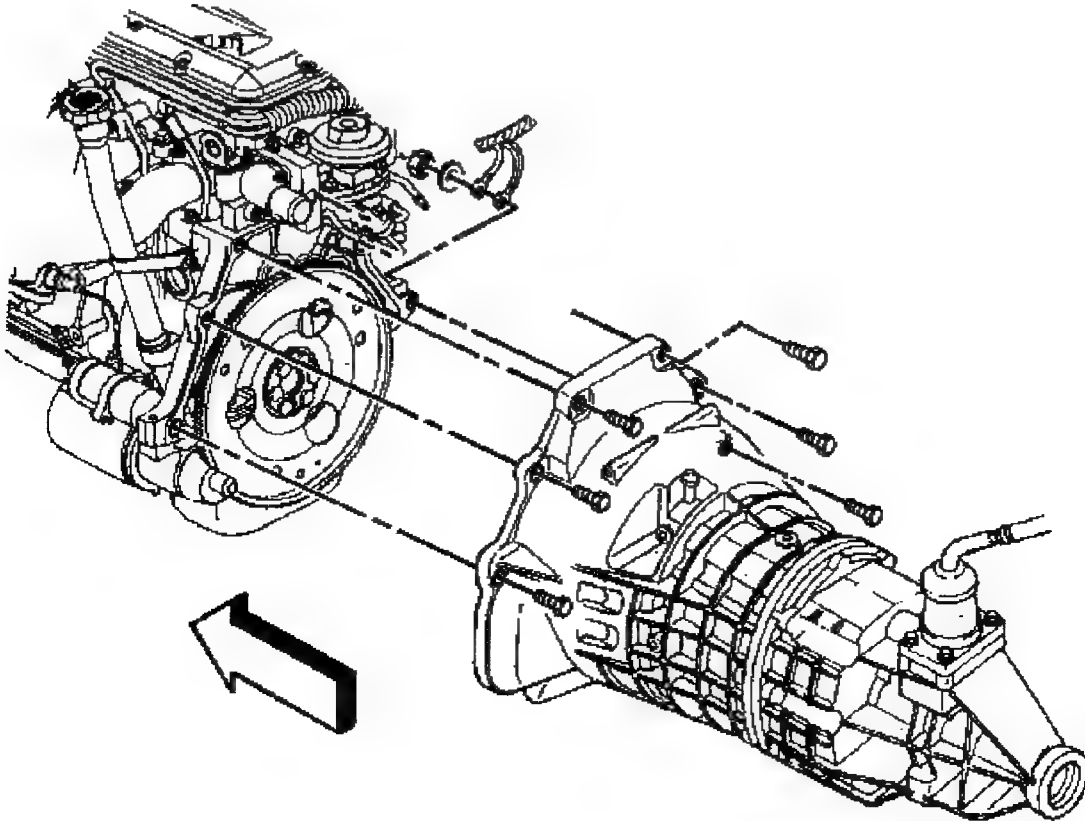


G00404643

Fig. 58: Disconnecting/Connecting Hydraulic Clutch Line Quick Connect
Courtesy of GENERAL MOTORS CORP.

17. Use **J 42371** to depress the white plastic sleeve on the quick connect to separate the clutch line end from the clutch actuator quick connect.
18. Remove 4 bolts securing the clutch housing cover to the transmission.
19. Support the transmission with a jack.
20. Remove the wiring harness from the front crossmember.
21. Lower the transmission enough to gain access to the top of the transmission.
22. Remove the fuel line retainers from the top of the transmission.
23. Remove the bolt, washer, and nut securing the wiring harness ground wires to the engine block.

24. Remove 5 bolts securing the transmission to the engine. Pull the transmission straight back on the clutch hub splines.
25. Lower the transmission using the transmission jack.
26. Pull the transmission straight back off the clutch hub splines. Do not let the transmission hang from the clutch assembly.



G00404644

Fig. 59: Removing/Installing Transmission
Courtesy of GENERAL MOTORS CORP.

27. Remove the transmission from the vehicle.

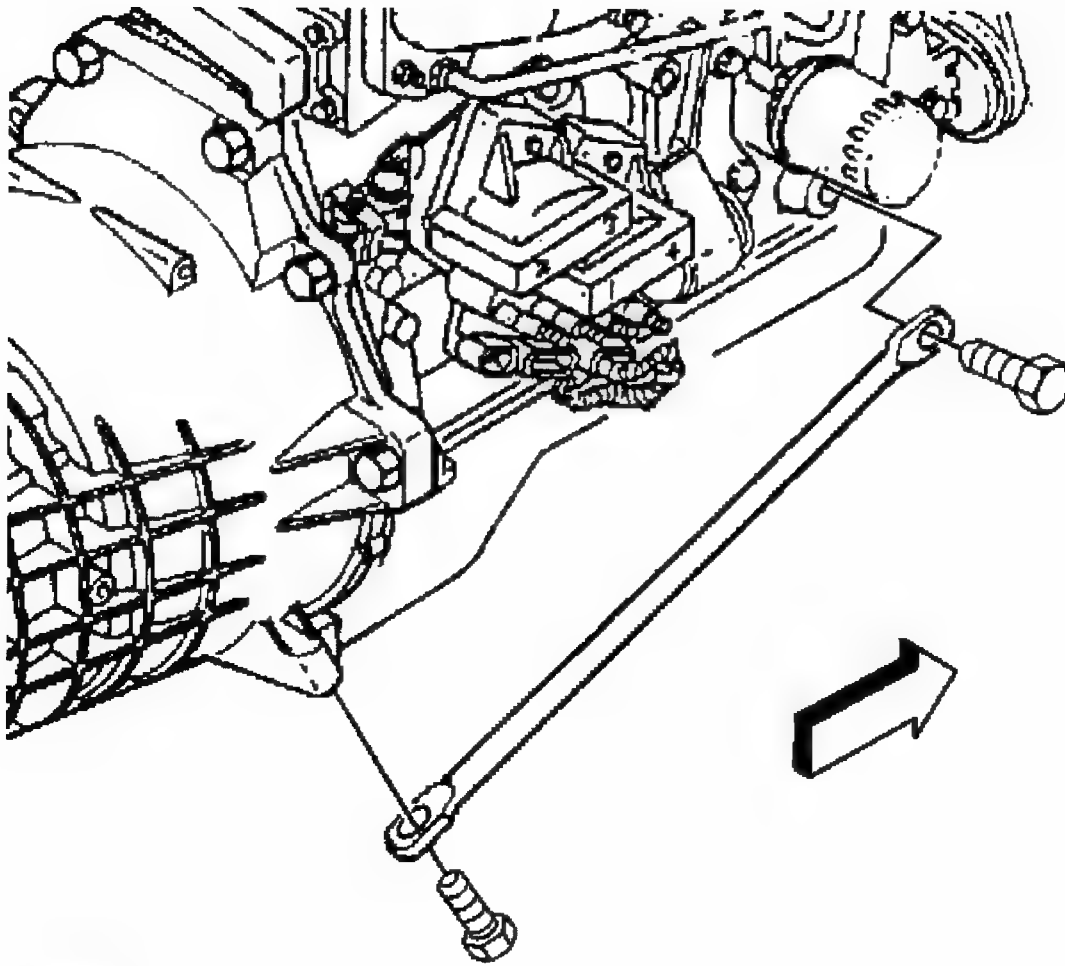
Installation Procedure

1. Raise the transmission using the transmission jack.
2. Place the fuel line retainers on top of the transmission.

NOTE: Notice: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or

sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

3. Install the transmission to the engine and secure with bolts. See **Fig. 59** . Push the transmission straight back onto the clutch hub splines. Tighten the transmission to the engine bolts. Tighten the bolts to 47 N.m (35 lb. ft).
4. Install the bolt, washer and nut securing the wiring harness ground wires to the engine block.
5. Install the housing cover and bolt. Tighten the clutch housing cover bolts to 14 N.m (10 lb. ft).
6. Install the hydraulic clutch line to the clutch actuator quick connect. See **Fig. 58** .
7. Install the transfer case, if equipped. Refer to **REMOVAL & INSTALLATION** .
8. Install 2 bolts securing the transmission right side brace to the engine and transmission. Tighten the right side brace bolts to 50 N.m (37 lb. ft).



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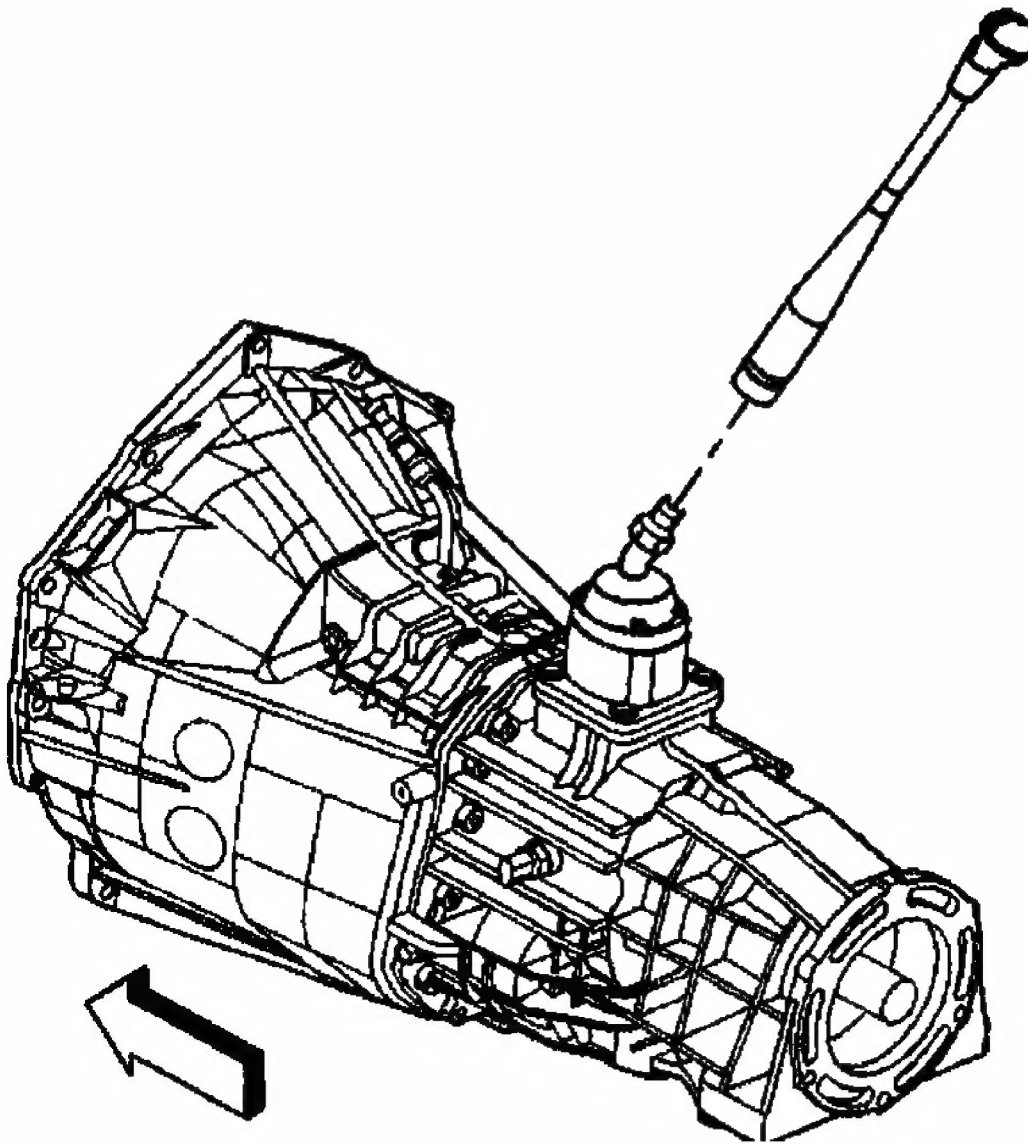
Fig. 60: Installing Right Side Engine-To-Transmission Brace
Courtesy of GENERAL MOTORS CORP.

9. Install 2 bolts and a nut securing the transmission left side brace to the engine and transmission. Tighten the left side brace bolts and nut to 50 N.m (37 lb. ft).
10. Install the bolt and stud securing the transmission left side brace to the transfer case. See **Fig. 35** . Tighten the left side brace bolt and stud to 50 N.m (37 lb. ft).
11. Install the left side brace to the transmission with the bolt. See **Fig. 34** . Tighten the left side brace bolt and stud to 50 N.m (37 lb. ft).
12. Install the right side brace to the transmission with the bolt. See **Fig. 36** . Tighten the left side brace bolt and stud to 50 N.m (37 lb. ft).
13. Install the bolt securing the right side brace to the transfer case. See **Fig. 37** . Tighten the left side brace bolt and stud to 50 N.m (37 lb. ft).
14. Install the catalytic converter hanger and exhaust section.
15. Install the exhaust pipes to the exhaust manifold.
16. Connect the muffler to the catalytic converter.

17. Install the wiring harness retainers to the right side of the transmission.
18. Connect the following engine harness electrical connectors:
 - VSS (1)
 - Backup lamp switch (3)
19. Install front driveshaft, if equipped.
20. Install rear driveshaft.
21. Install the shift housing. Refer to **Shift Tower Replacement** .
22. Connect the clutch actuator cylinder hose to the clutch master cylinder hose.
23. Install the shift lever assembly. Refer to **Shift Lever Assembly Replacement** .

DESCRIPTION & OPERATION

TRANSMISSION SYSTEM DESCRIPTION & OPERATION



G01715350

Fig. 61: New Venture Gear NV 3500 Transmission Assembly

The New Venture Gear NV 3500 is a 5 speed manual transmission used on light duty trucks with the 4.3L engine. The NV 3500 is identified by RPO M50 and RPO MG5. The difference between the RPO codes is the first speed gear ratios that the transmission has. The shift assembly design inside the NV 3500 transmission installed on C/K trucks is different than the NV 3500 transmissions installed in smaller S/T trucks. The distance between the input shaft and the countershaft is 85 mm (0.132 in). The transmission is available in rear wheel drive and four wheel drive.

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

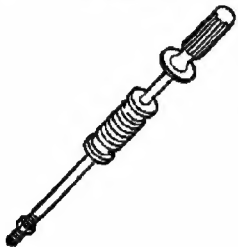
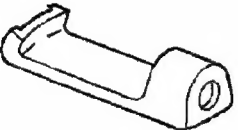

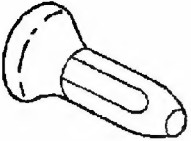
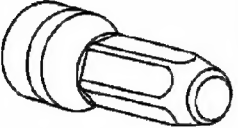
The transmission has the following features:

- Constant mesh helical gearing for reduced noise
- A 2 piece aluminum housing
- Synchronized shifting in all forward gears
- A shift tower mounted shift lever
- A single rail shift system

SPECIAL TOOLS & EQUIPMENT

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

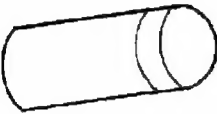
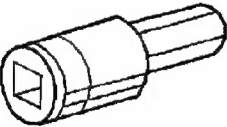
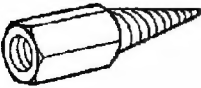
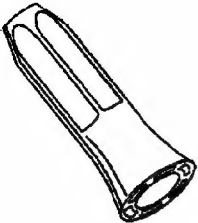
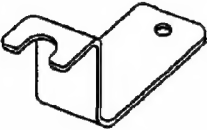
Illustration	Part Number/Description
	J 6125-1B Slide Hammer
	J 23129 Universal Seal Remover
	J 23907 Slide Hammer
	J 36502 Extension Housing Seal Installer
	J 36503 Extension Housing Seal Installer

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Fig. 62: Special Tools & Equipment (1 Of 2)

2001 Chevrolet S10 Pickup

2001 MANUAL TRANSMISSIONS NV 3500 Diagnosis - Blazer, Jimmy, Sonoma & S10 Pickup

Illustration	Part Number/Description
	J 36502-2A Output Shaft Oil Seal Protector
	J 36511 Oil Fill/Drain Plug Hex Bit (17 mm)
	J 36825-A Output Shaft Oil Seal Remover
	J 38801 Input Shaft Seal Installer
	J 42371 Hydraulic Clutch Line Separator

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Fig. 63: Special Tools & Equipment (2 Of 2)